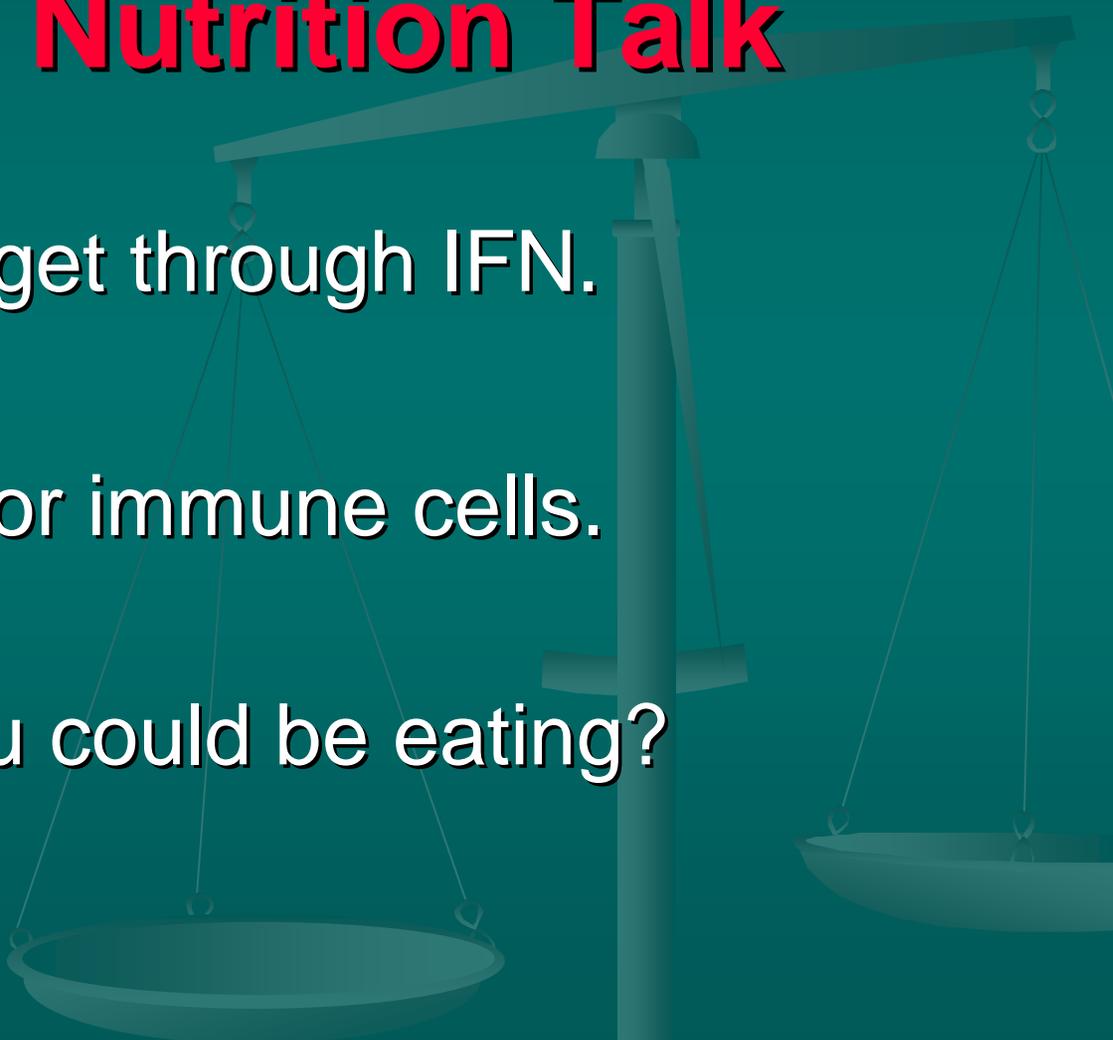


# Nutrition Support For People with HCV



Charlie Smigelski RD  
nutrishn@aol.com

# Today's Nutrition Talk

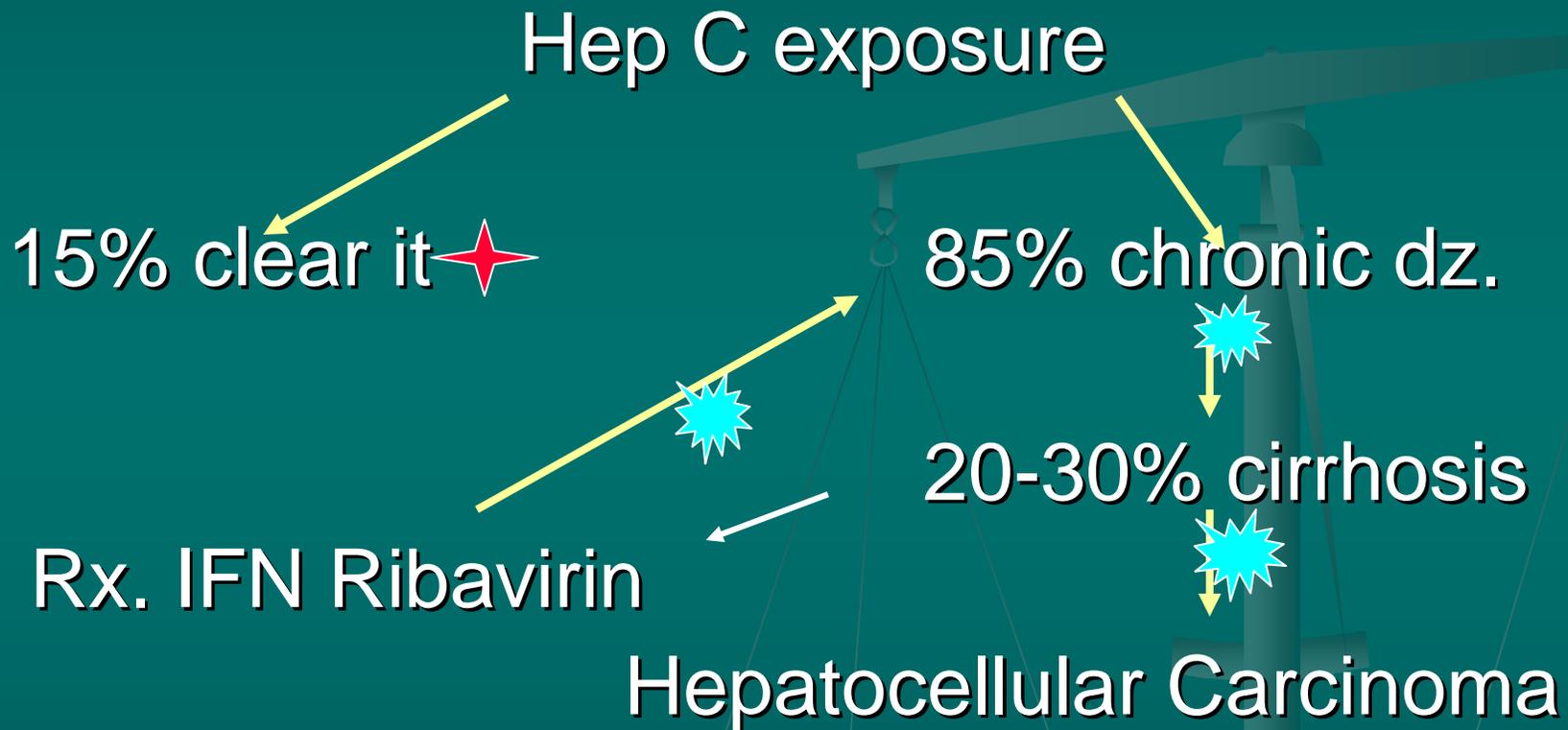


Supplements to get through IFN.

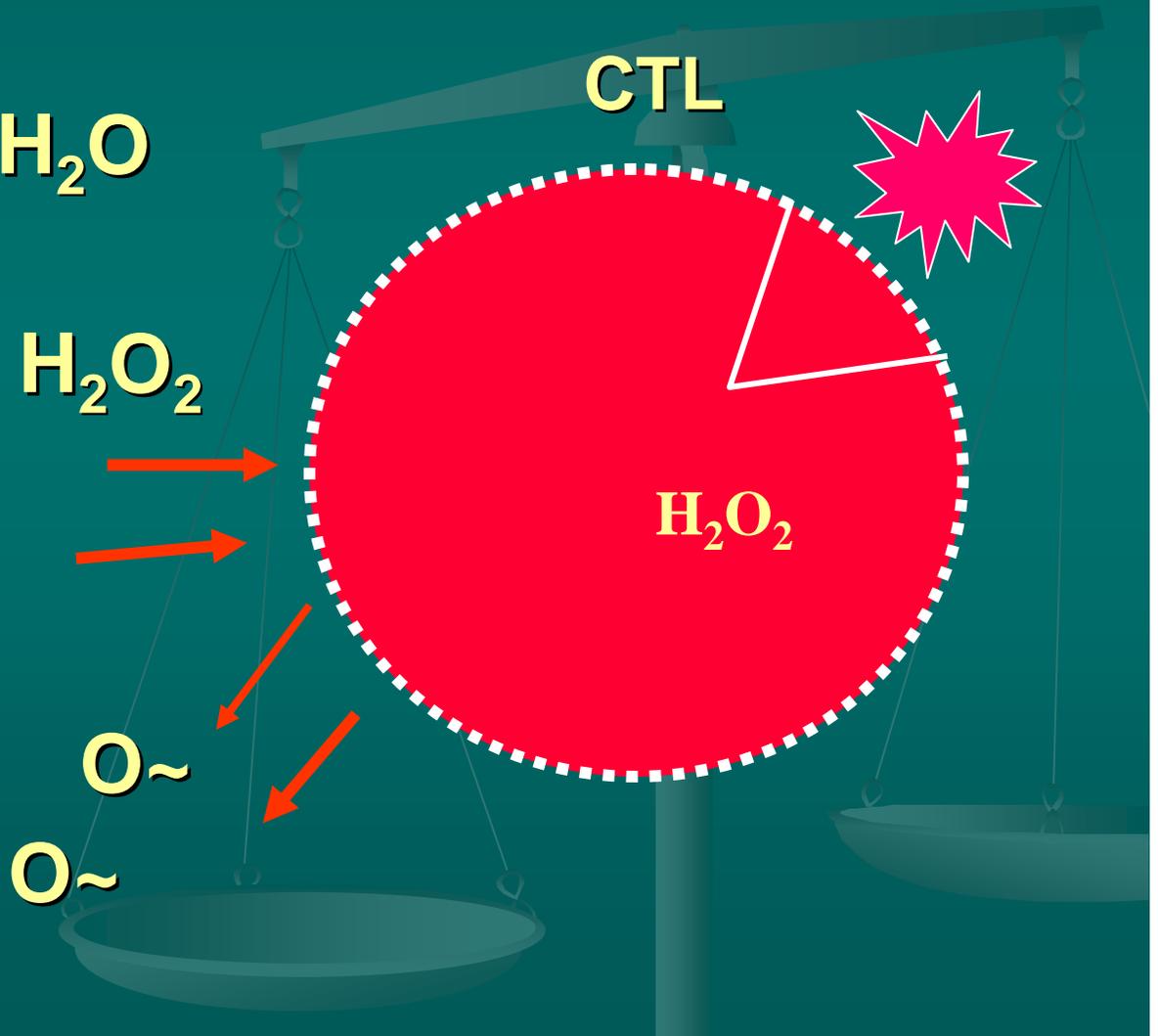
Nutritional help for immune cells.

The best diet you could be eating?

# Chronic HCV



# CD8 Cytotoxic T Lymphocytes

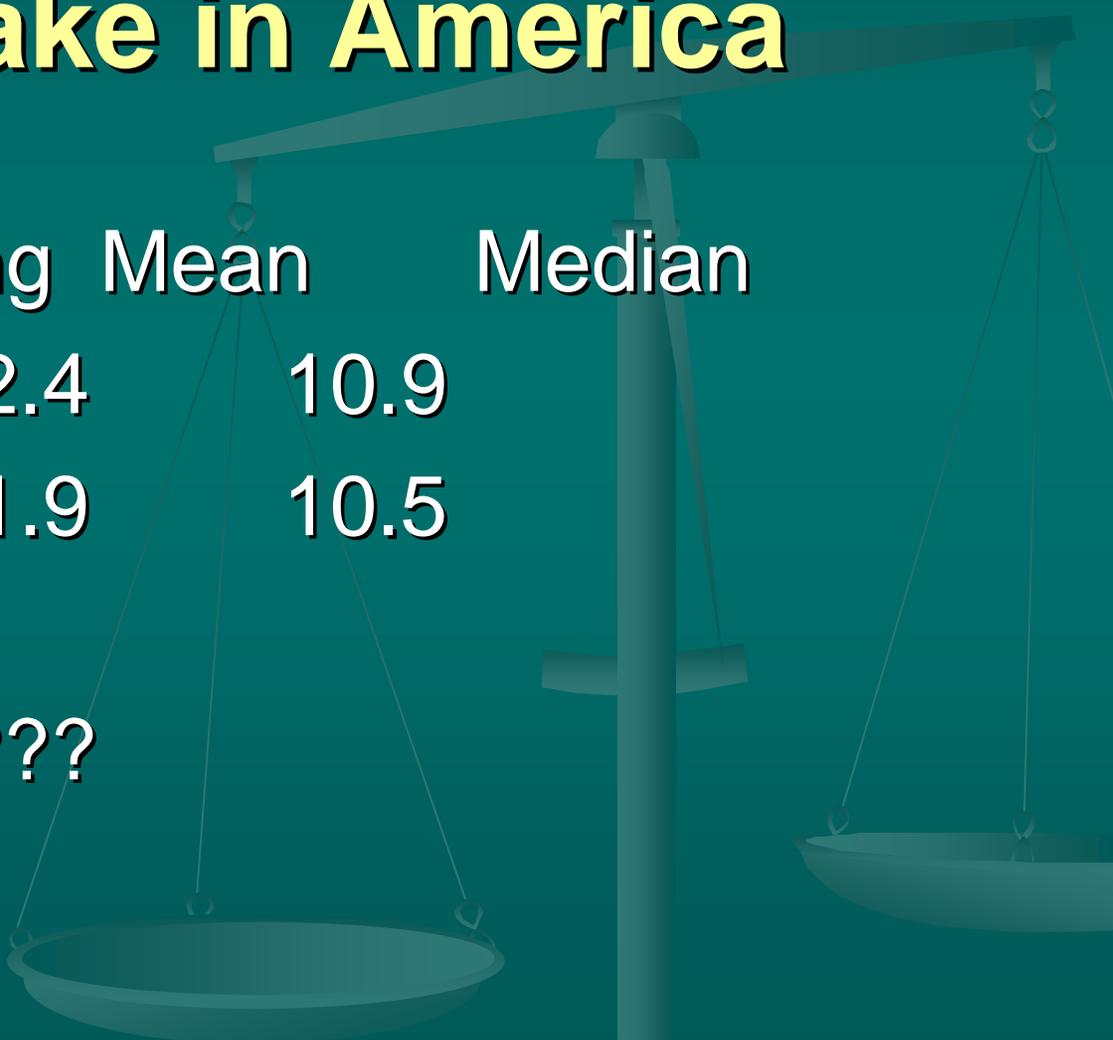


# IMMUNOLOGY



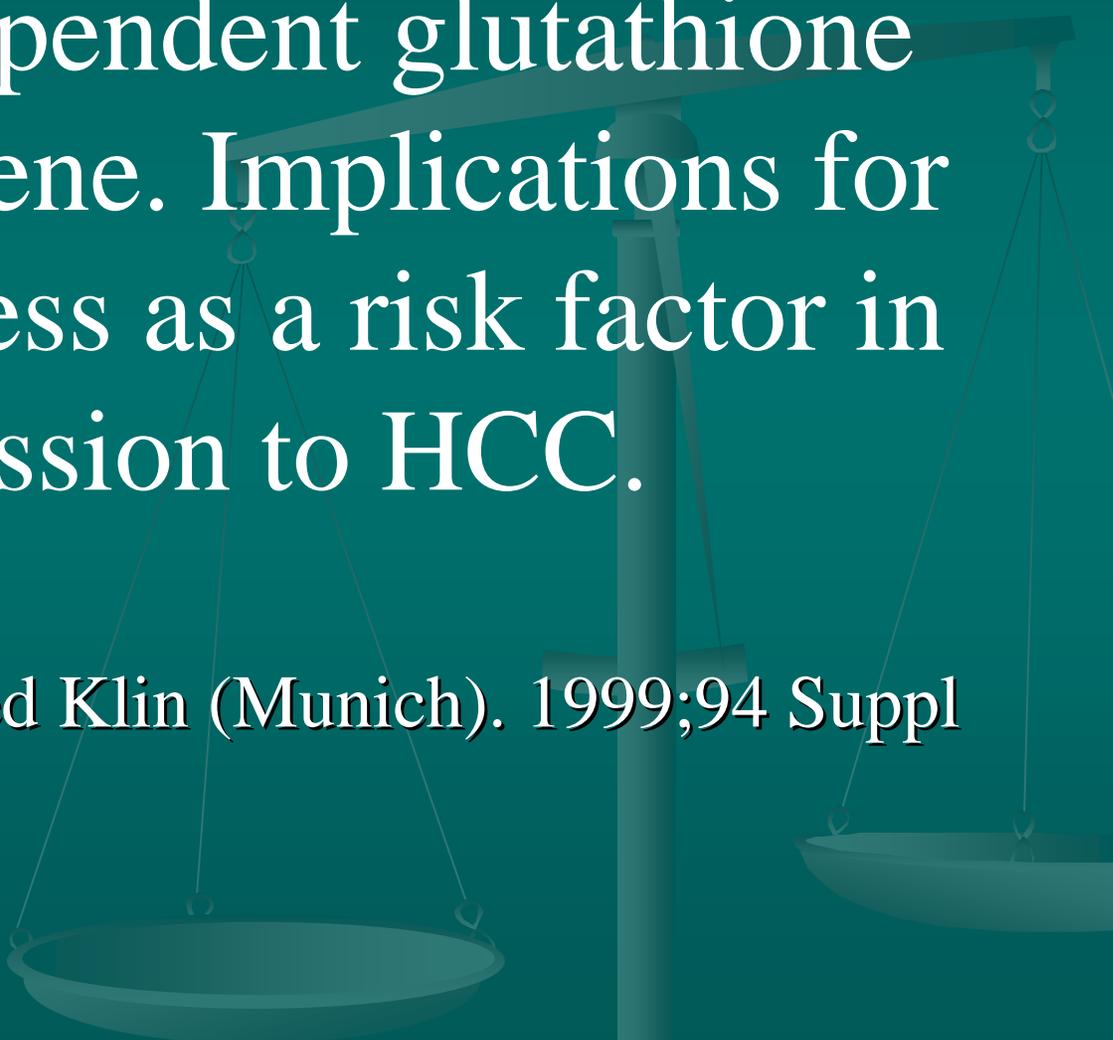
Lower GSH Selenium Zinc: TH1 > TH2

# Zinc intake in America



RDA	12/15 mg	Mean	Median
age 20-39	12.4	10.9	
age 40-59	11.9	10.5	

Zinc foods: ???



Hepatitis C virus encodes a **selenium**-dependent glutathione peroxidase gene. Implications for oxidative stress as a risk factor in progression to HCC.

Zhang ... Taylor Med Klin (Munich). 1999;94 Suppl  
3:2-6.

# Iron, Innocent Bystander?

N=34	IFN/RVN failures	6 yrs
(8-OHdG)*	Low Fe	Reg Fe
HCC	0	(16-23%)

Total, Special K, Vitamins, Ensure, etc.

Kato, Cancer Res 2001 61(24) 8697-702

\*(8-oxo-7, 8-dihydro-2' doxyguanosine)

# Chronic HCV

Hep C exposure

15% clear it

85% chronic dz.

Zn ↓ Se

20-30% cirrhosis

(Fe) ↓ Se

Heterocellular Carcinoma

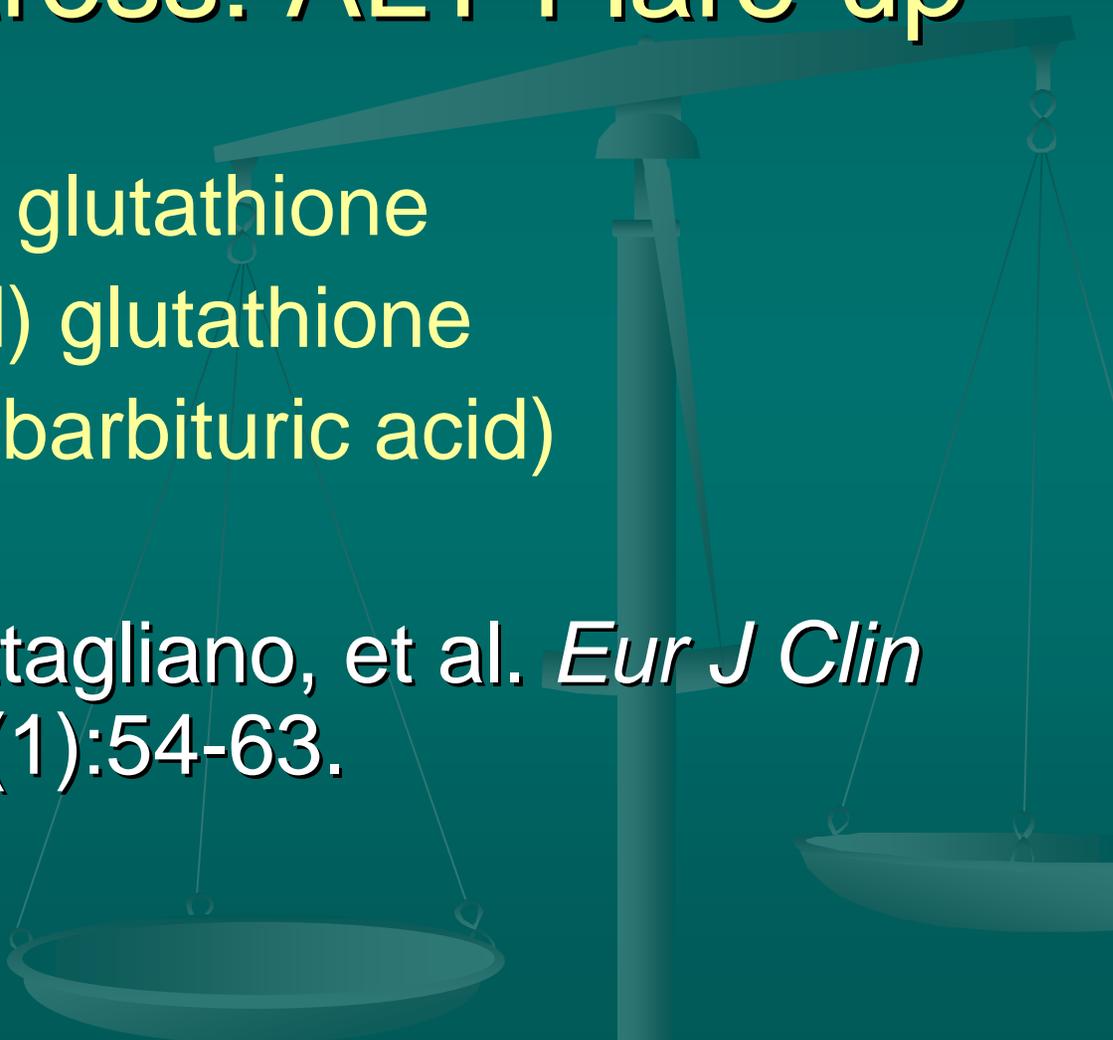
Rx. IFN Ribavirin

# Oxidative Stress In Symptom-free HCV carriers: relation with ALT Flare-up

N=30; median 49 yrs, (27-60), chronic HCV 1b,  
-6 .... 0 ... +18 mo. Nml ALT at enrollment  
Serum markers for Oxidative stress q 2 mo.  
Liver biopsy for GSH and MDA & histology  
Sulphhydryl proteins (P-SH)

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

# Oxidative Stress: ALT Flare-up



GSH (reduced) glutathione

GSSG (oxidized) glutathione

MDA (using thiobarbituric acid)

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

# Oxidative Stress: ALT Flare-up

... detect disease evolution based on redox capacity ...

**Group A** (16)

~ nml redox

GSH  $\geq 3$  mmol/g

MDA  $\leq 75$  nmol/g

**Group B** (14)

altered redox

< 3 mmol/g

> 75 pmol/g

ALT values comparable for first 12 months

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

# Oxidative Stress: ALT Flare-up

Group A (16)

Group B (14)

ALT flare 2 (13.5%)

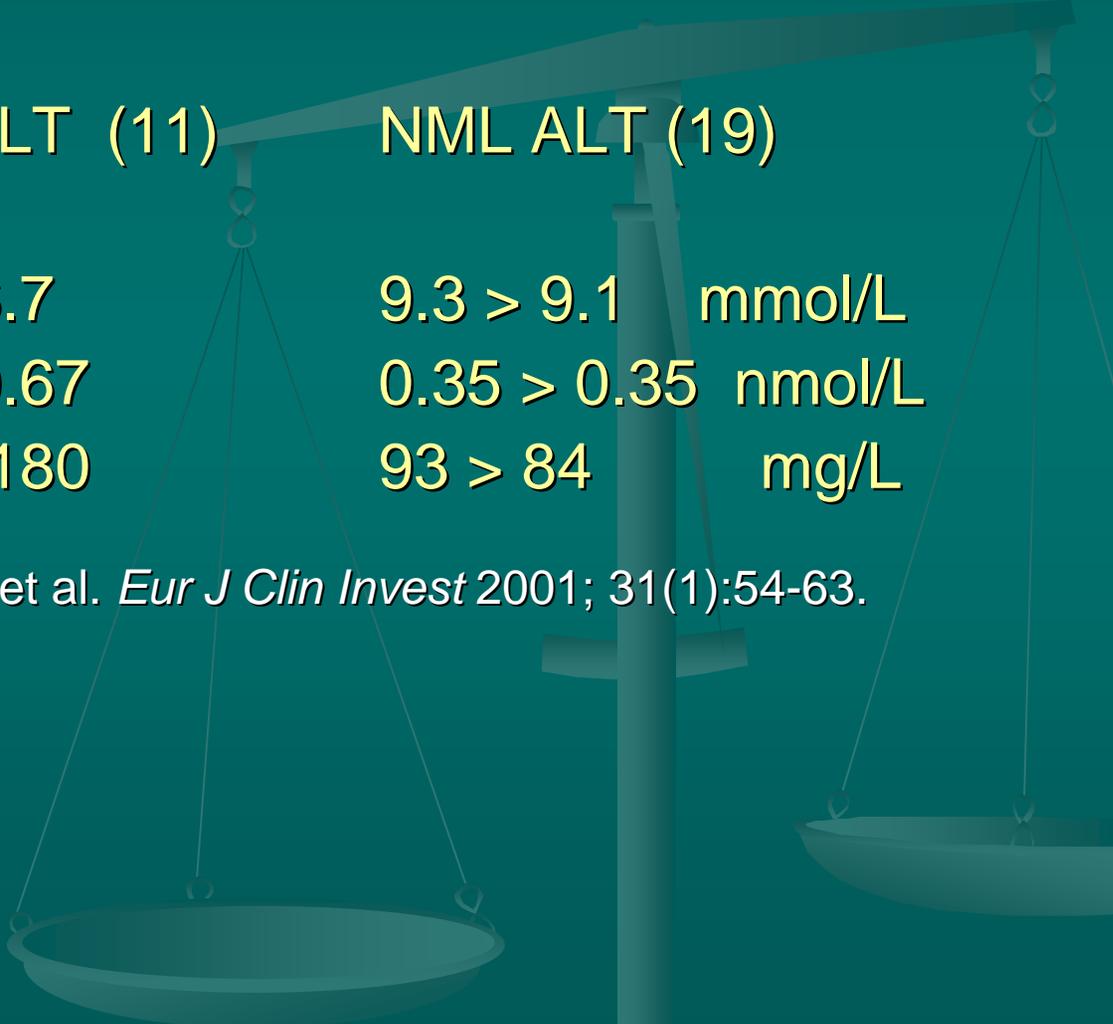
9 (64%)

New sort No flare 19

ALT flare 11

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

# Oxidative Stress: ALT Flare-up



T <sub>0</sub> - T <sub>18</sub>	High ALT (11)	NML ALT (19)
<b>GSH</b>	8.1 > 6.7	9.3 > 9.1 mmol/L
<b>MDA</b>	0.5 > 0.67	0.35 > 0.35 nmol/L
<b>Ferritin</b>	164 > 180	93 > 84 mg/L

Vendemiale, Grattagliano, et al. *Eur J Clin Invest* 2001; 31(1):54-63.

**High serum ALT in HCV and  
more rapid development of  
HCC in pt's with cirrhosis.**

Tarao et al. Cancer, 1999;  
86(4):589-95

# High ALT > cirrhosis > HCC.

69 HCV cirrhosis (Child's A)

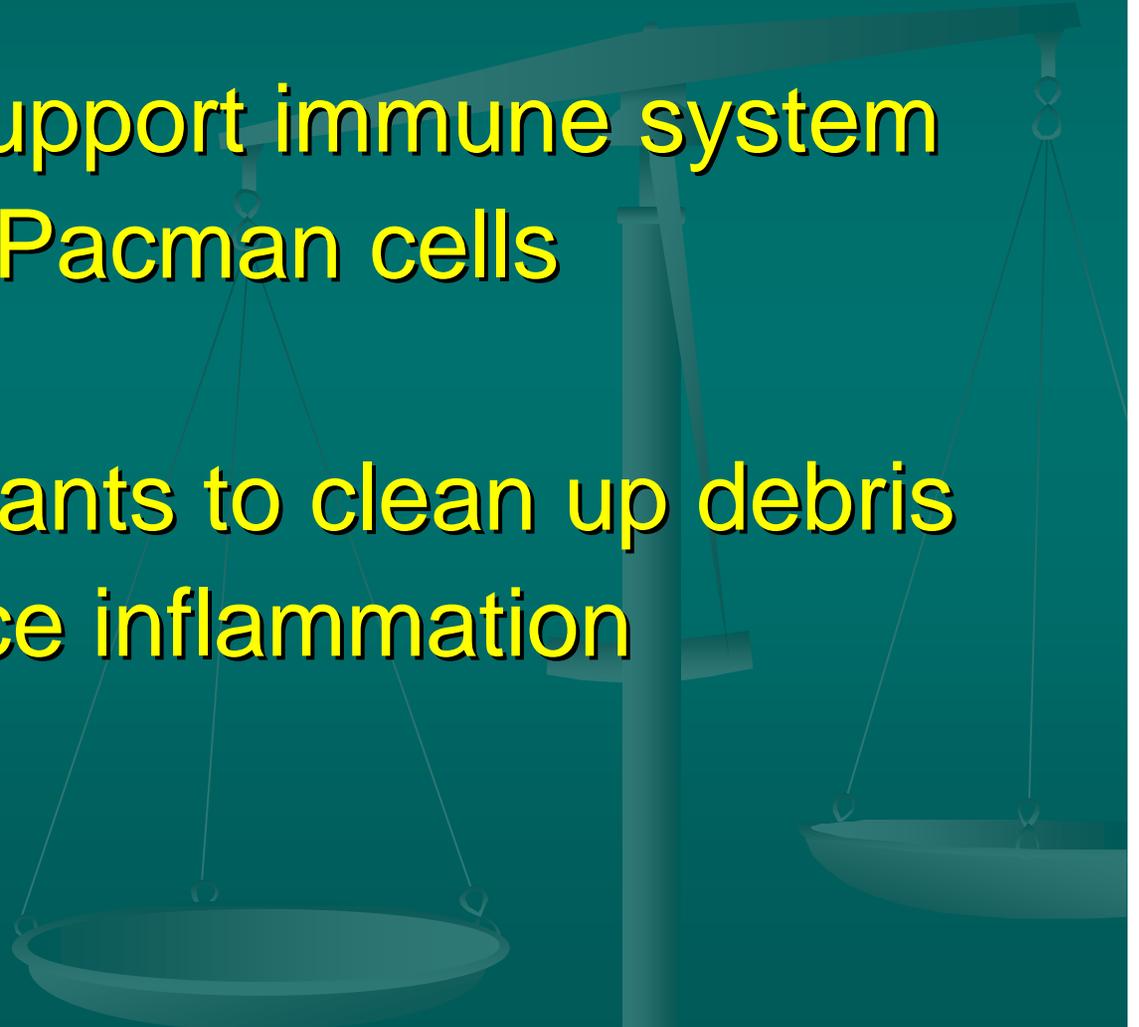
	A/28	B/13	C/28
ALT: < 80	Variable	>	80
HCC	7.1%	5 yr	53.6%
HCC	25%	10 yr	71.4%

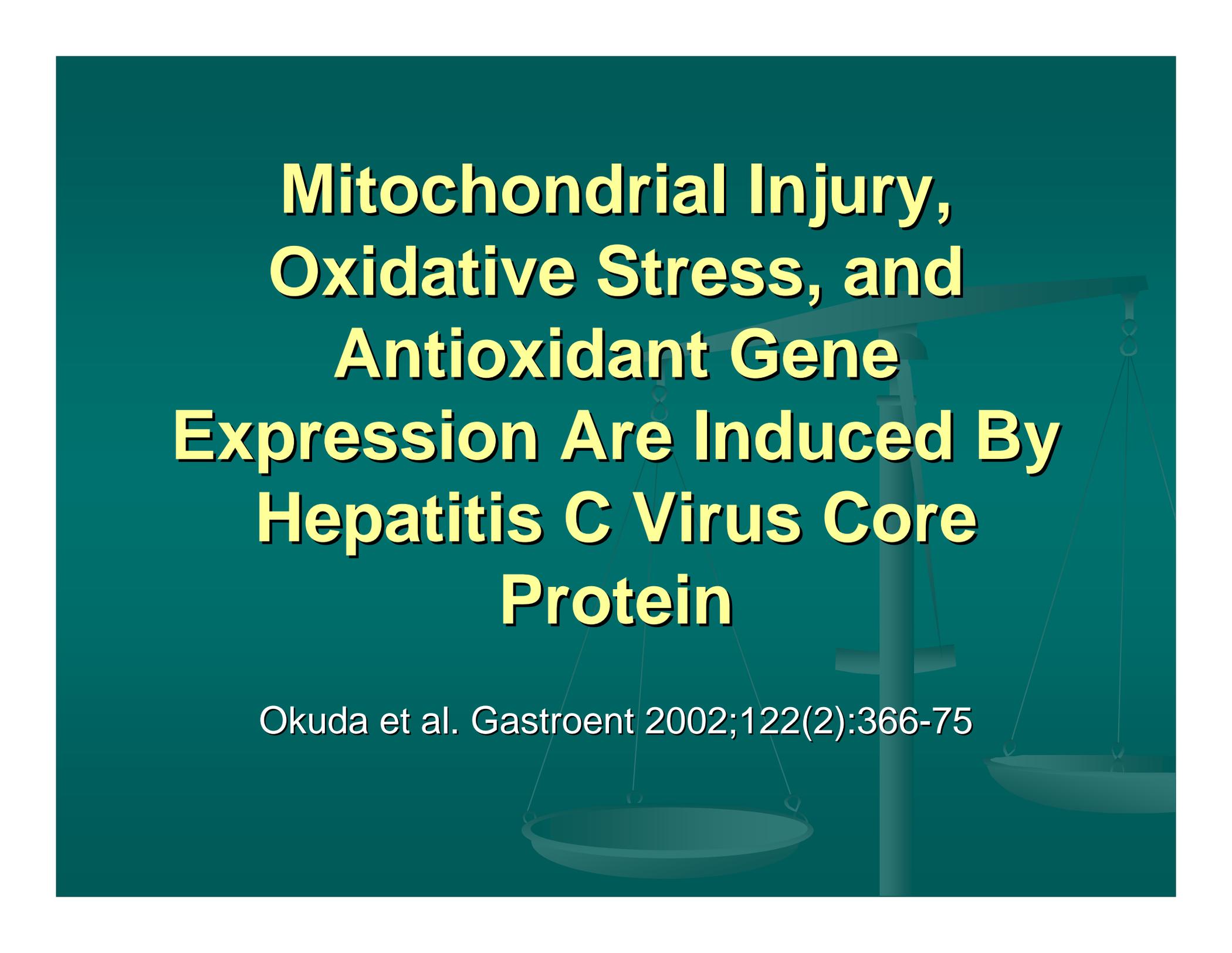
Tarao et al. Cancer, 1999; 86(4):589-95

# HCV HIV Care

Vitamins to support immune system  
... CTL's Pacman cells

Take antioxidants to clean up debris  
and reduce inflammation

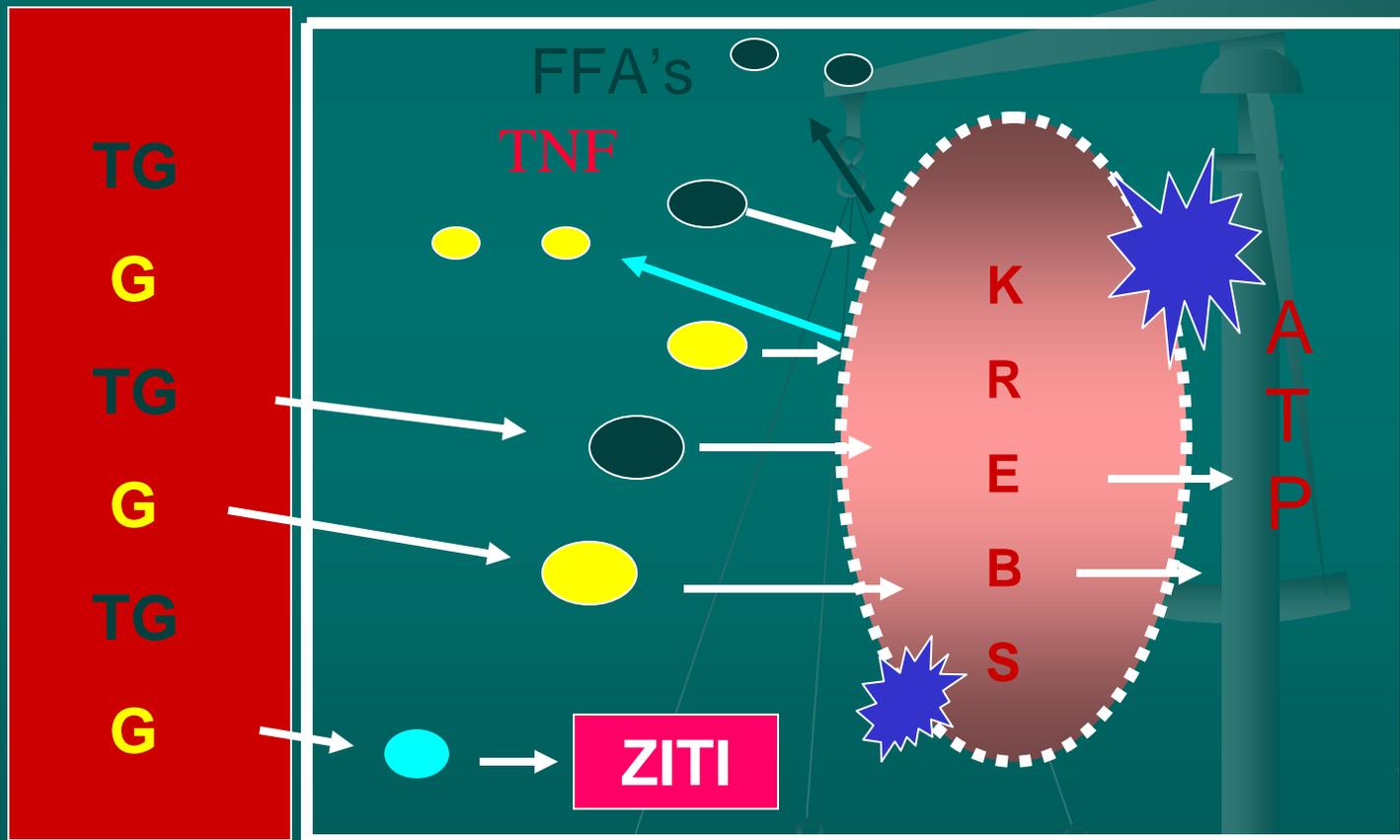




**Mitochondrial Injury,  
Oxidative Stress, and  
Antioxidant Gene  
Expression Are Induced By  
Hepatitis C Virus Core  
Protein**

Okuda et al. Gastroent 2002;122(2):366-75

# Making Energy: ATP



# HCV Insulin Resistance



Age >40: 3x the DM rate in HCV+ people

Normal GTT, but higher fasting Insulin levels  
Feeding High Fat diet led to overt diabetes

Higher TNFa

Shintani, et al. Gastroent 2004;126:840-8.

# HCV Insulin Resistance

- HCV confers insulin resistance in liver
- Other elements generate overt diabetes:

**Obesity      Aging      Inflammation**

Shintani, et al. Gastroent 2004;126:840-8.

# The Fats Of Life

$\eta - 6$

LA- corn oil

GLA-primrose

Hihomo GLA

AA arachidonic

(Cyclo-ox PGE<sub>2</sub>)

D-6\*

D-5\*

D-4\*

$\eta - 3$

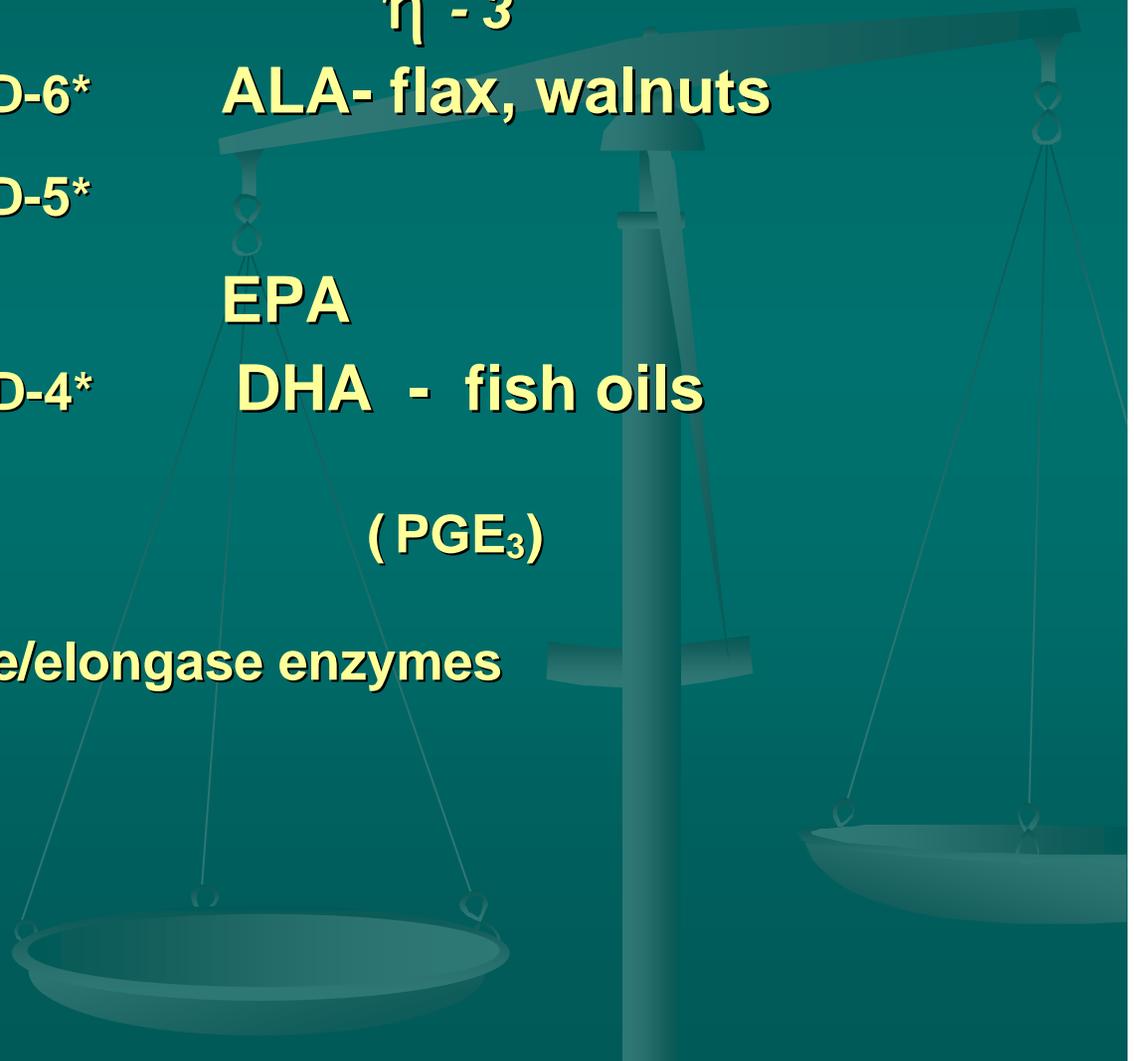
ALA- flax, walnuts

EPA

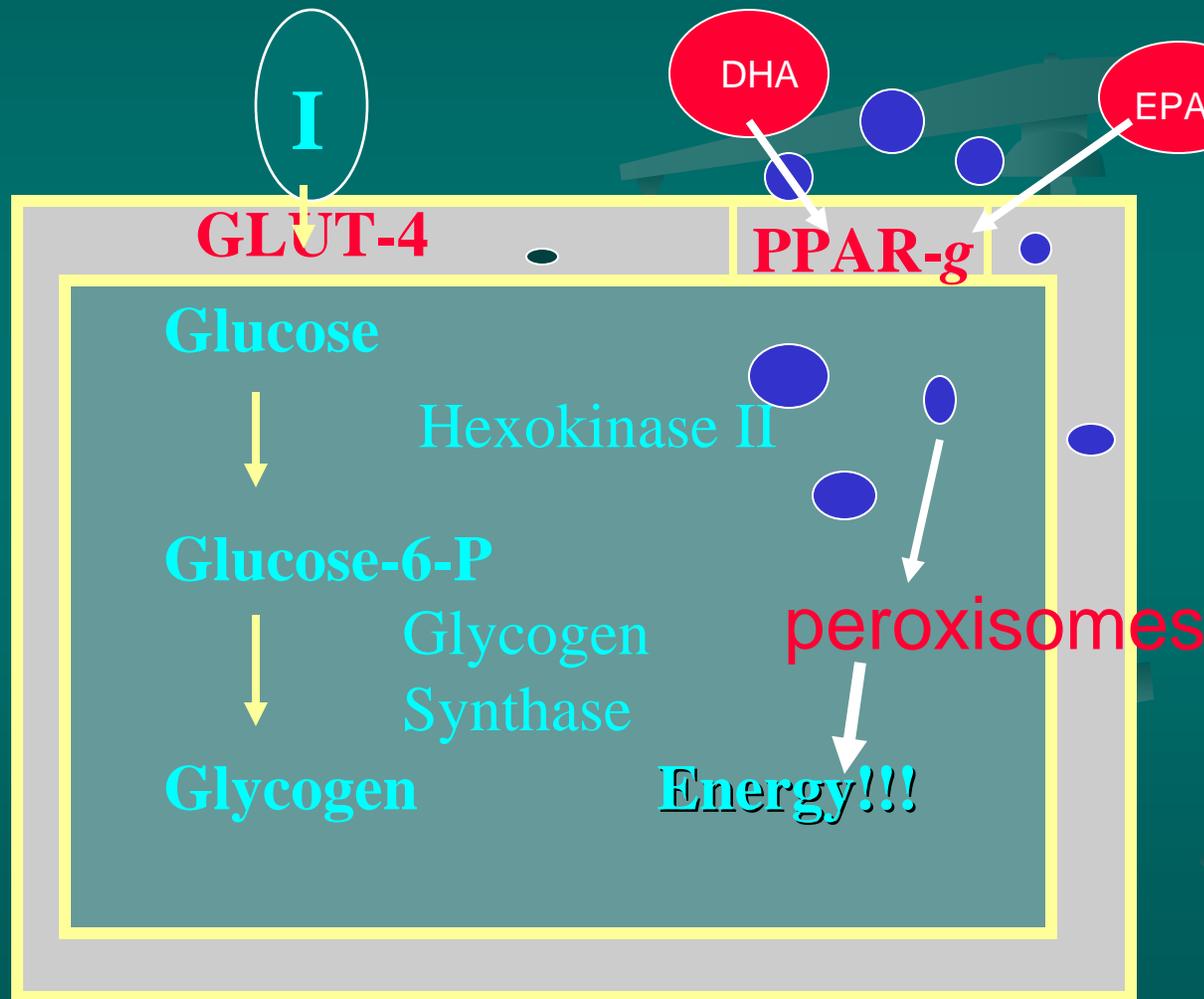
DHA - fish oils

(PGE<sub>3</sub>)

\*Delta 6, 5, 4 desaturase/elongase enzymes



# EPA/DHA Action on Cells

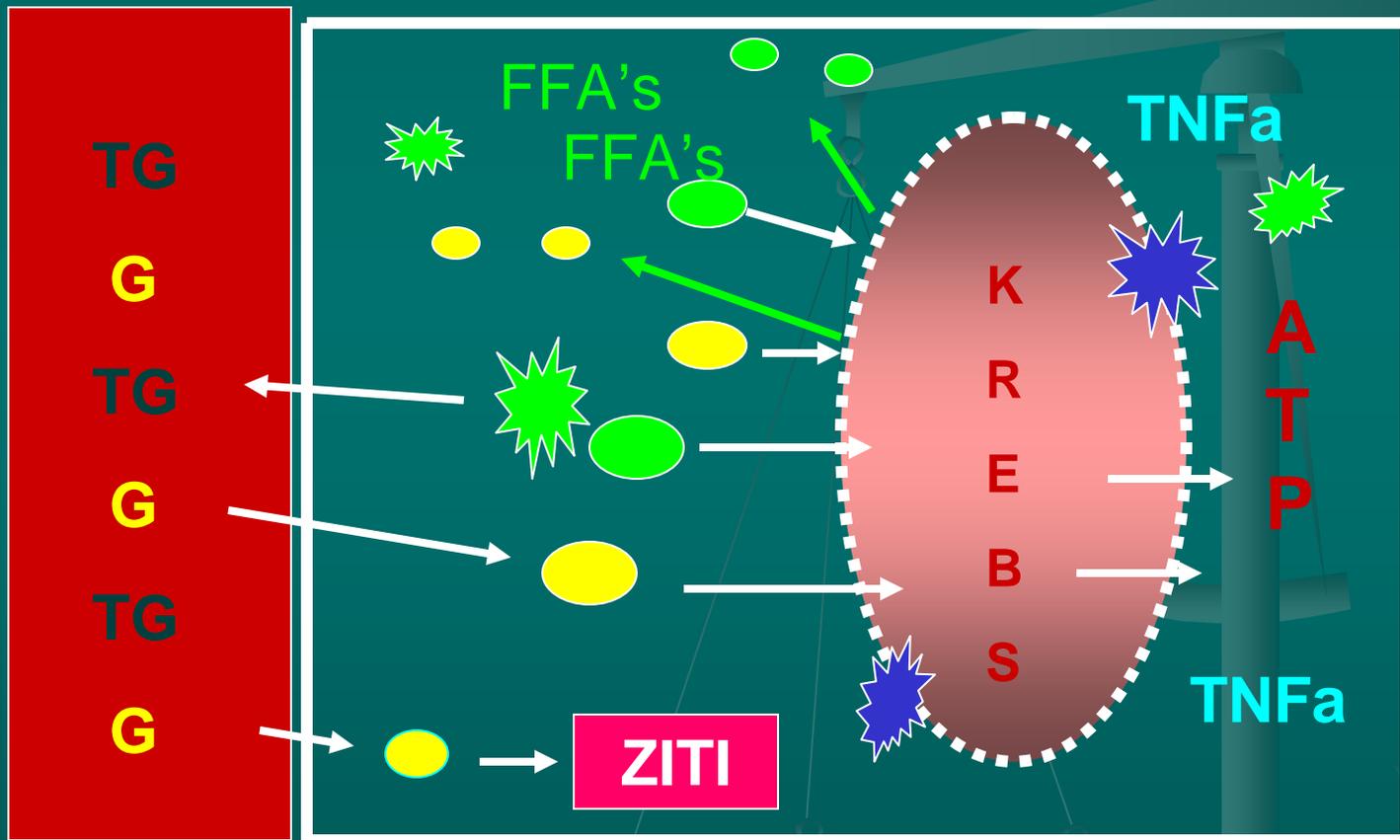


# HCV inhibits TG's and VLDL secretion:

- Interfering with hepatic assembly and secretion of triglyceride-rich VLDL.
- Reduction in microsomal transfer protein (MTP)

Perlemuter et al. FASEB J. 2002; 16(2): 185

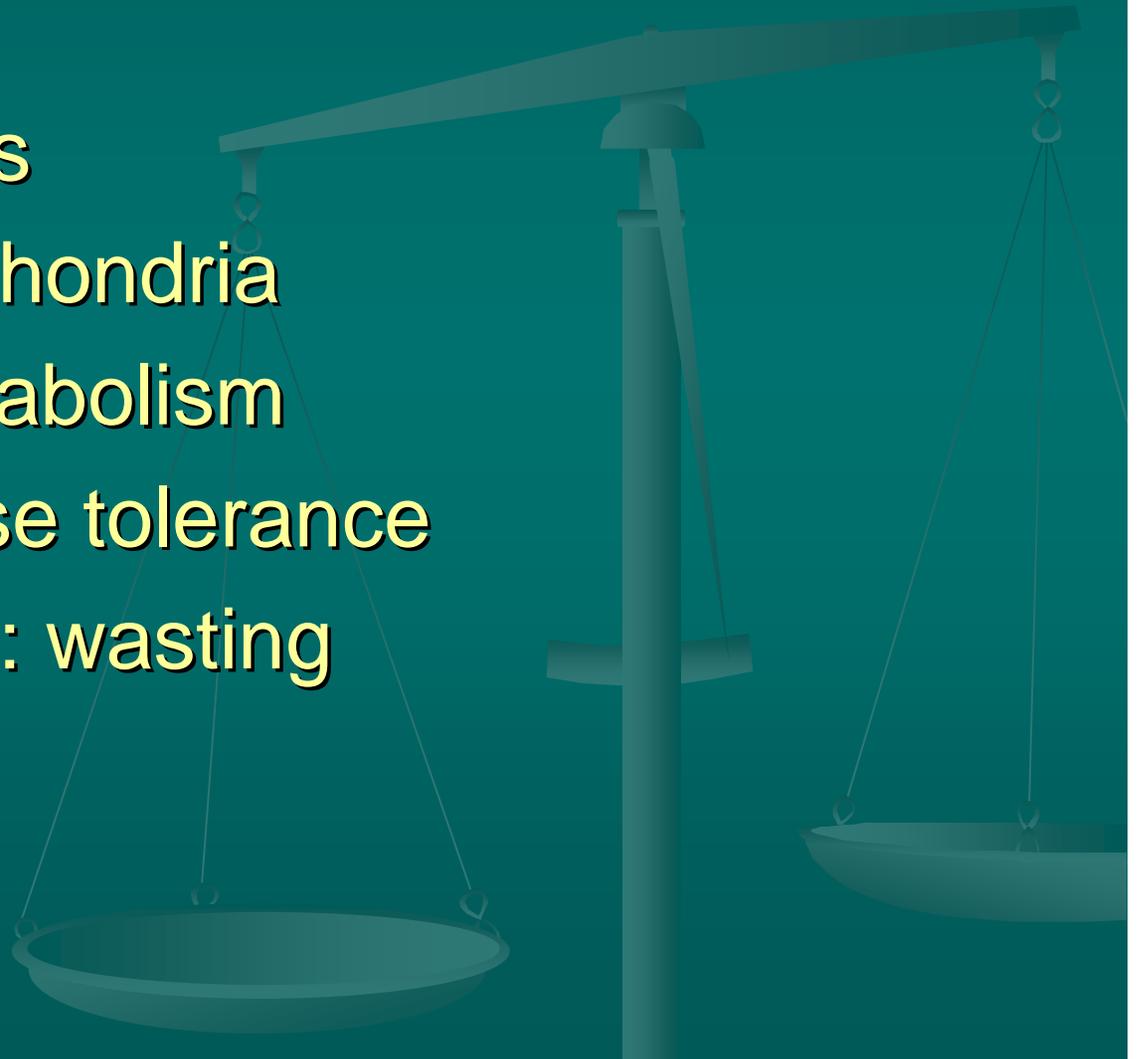
# Grease, Sugar, Leaks & TNF $\alpha$



# HCV Pathophysiology

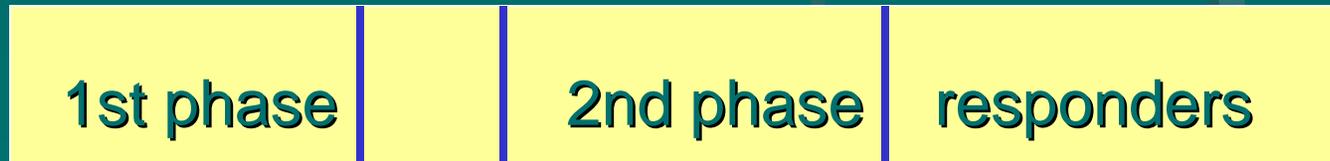
## Repair Issues:

- Oxidative stress
- Damaged mitochondria
- Improve fat metabolism
- Preserve glucose tolerance
- Reduce IFN Tx : wasting



# Vit E improves ALT status

N=23 2 x 400iu/d 12 wks alpha-tocopherol



0 12 16 28 (weeks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

# Vit E 400 iu bid

11/23 were responders: 48%

ALT down: 17%, 23%, 24% (4, 8, 12 wks)

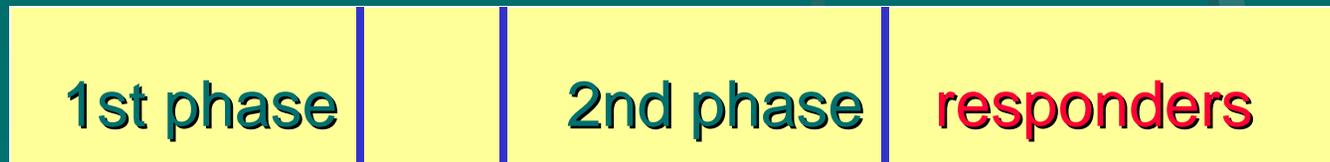
11 responders: > 35% drop

ALT resp: 31%, 40%, 46% (4, 8, 12 wks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

# Vit E improves ALT status

N=23 2 x 400iu/d 12 wks alpha-tocopherol



0 12 16 28 (weeks)

Von Herbay et al. Free Radic Res 1997; 27(6):599-605.

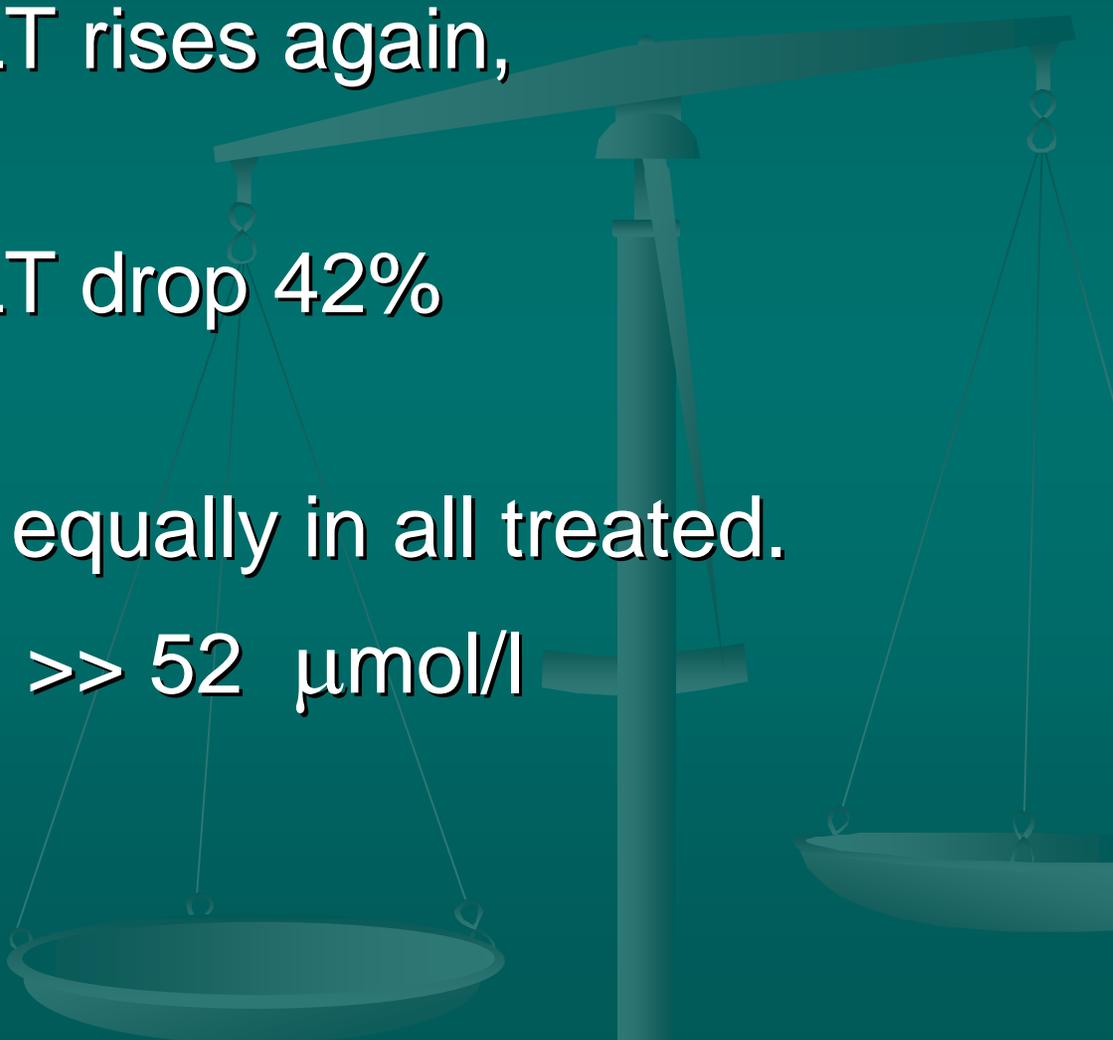
# Vit E improves ALT status

Washout: ALT rises again,

... **retreat:** ALT drop 42%

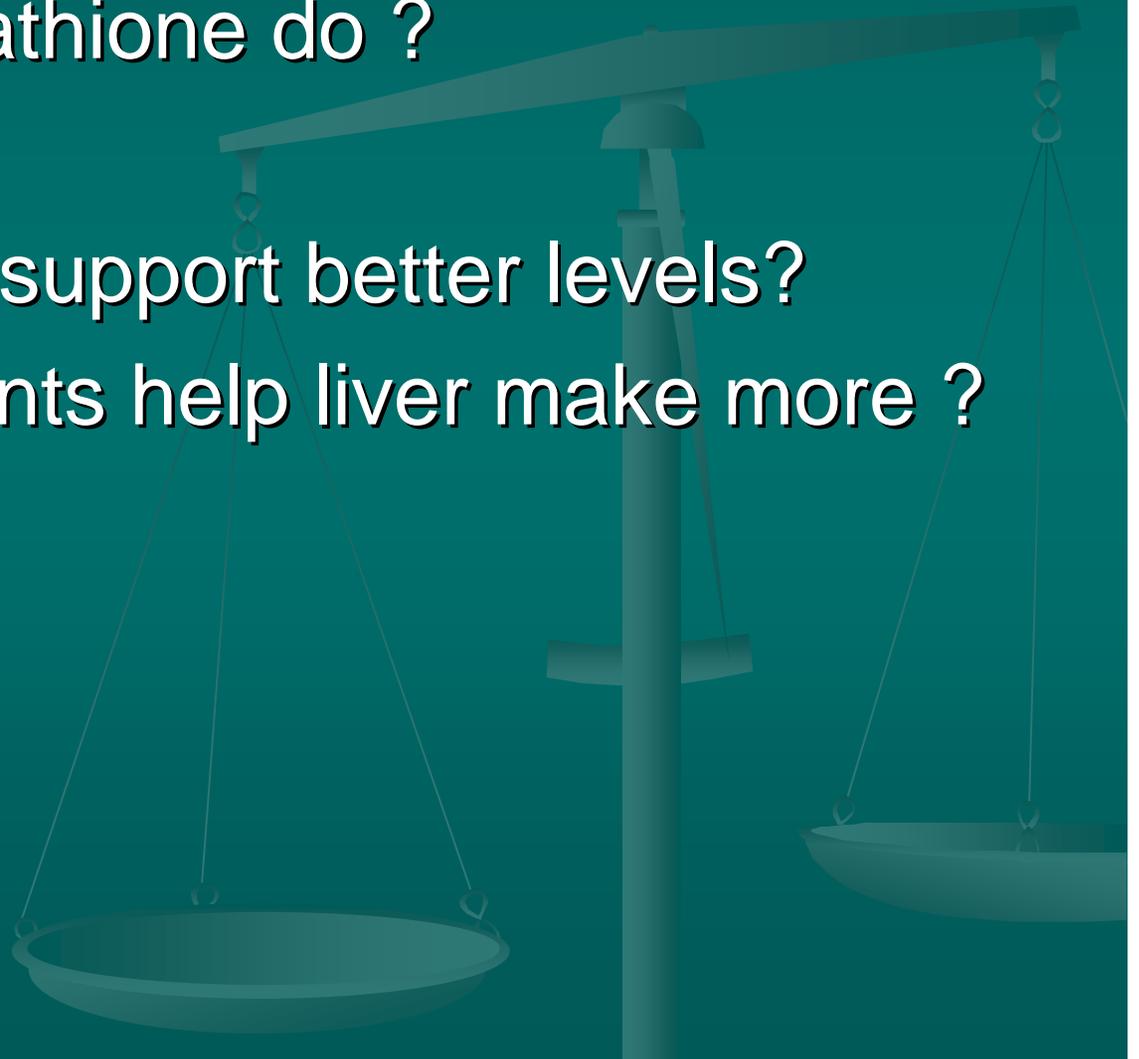
serum vit E rose equally in all treated.

~ 25 >> 52  $\mu\text{mol/l}$



# Glutathione for repair ?

- What does glutathione do ?
- What groceries support better levels?
- What supplements help liver make more ?



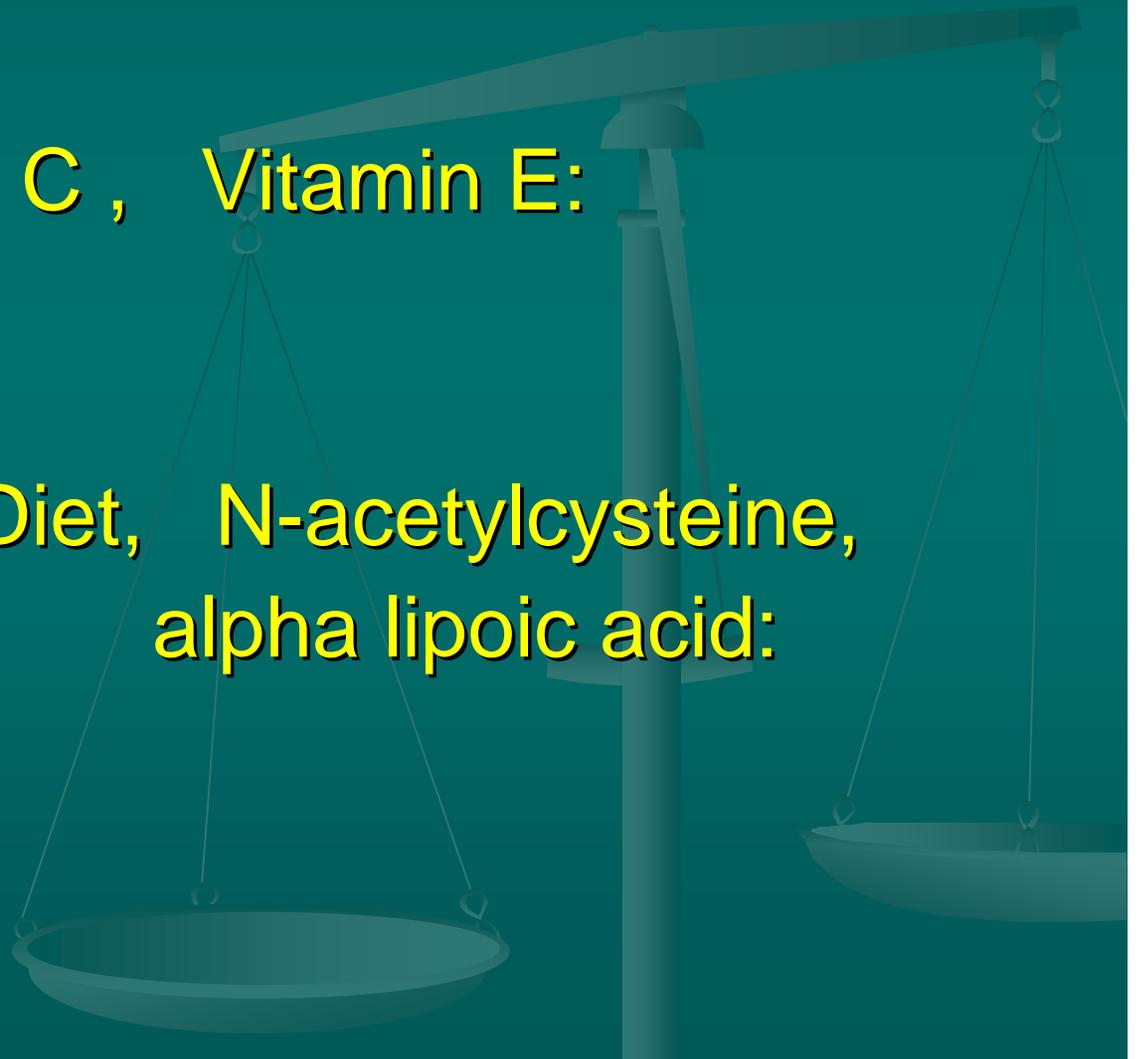
# Improve Glutathione Levels ?

GSH-sparing:

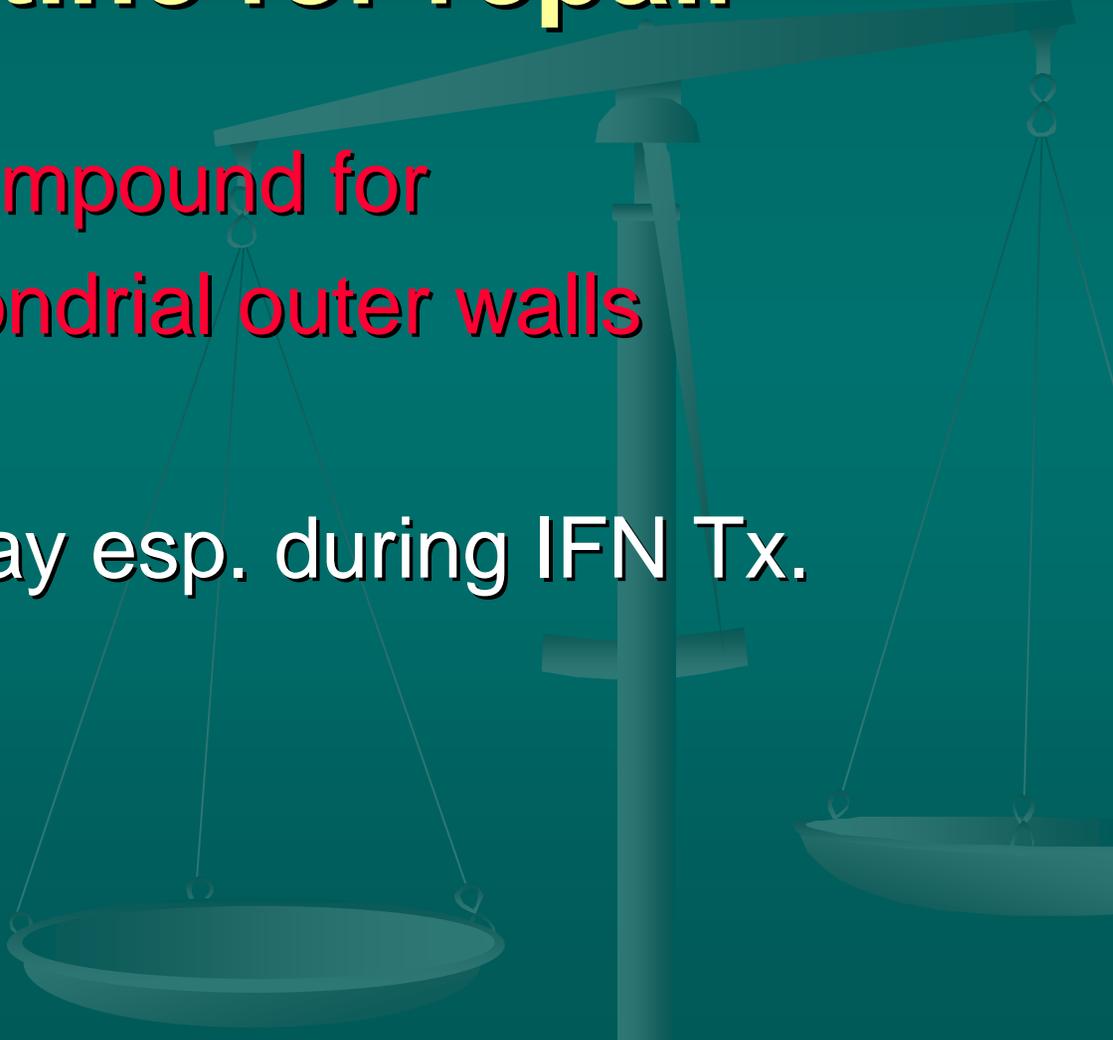
Vitamin C , Vitamin E:

GSH-boosting:

Higher Protein Diet, N-acetylcysteine,  
L-glutamine, alpha lipoic acid:



# L-Carnitine for repair



Spackling compound for  
mitochondrial outer walls

1-2 grams/day esp. during IFN Tx.

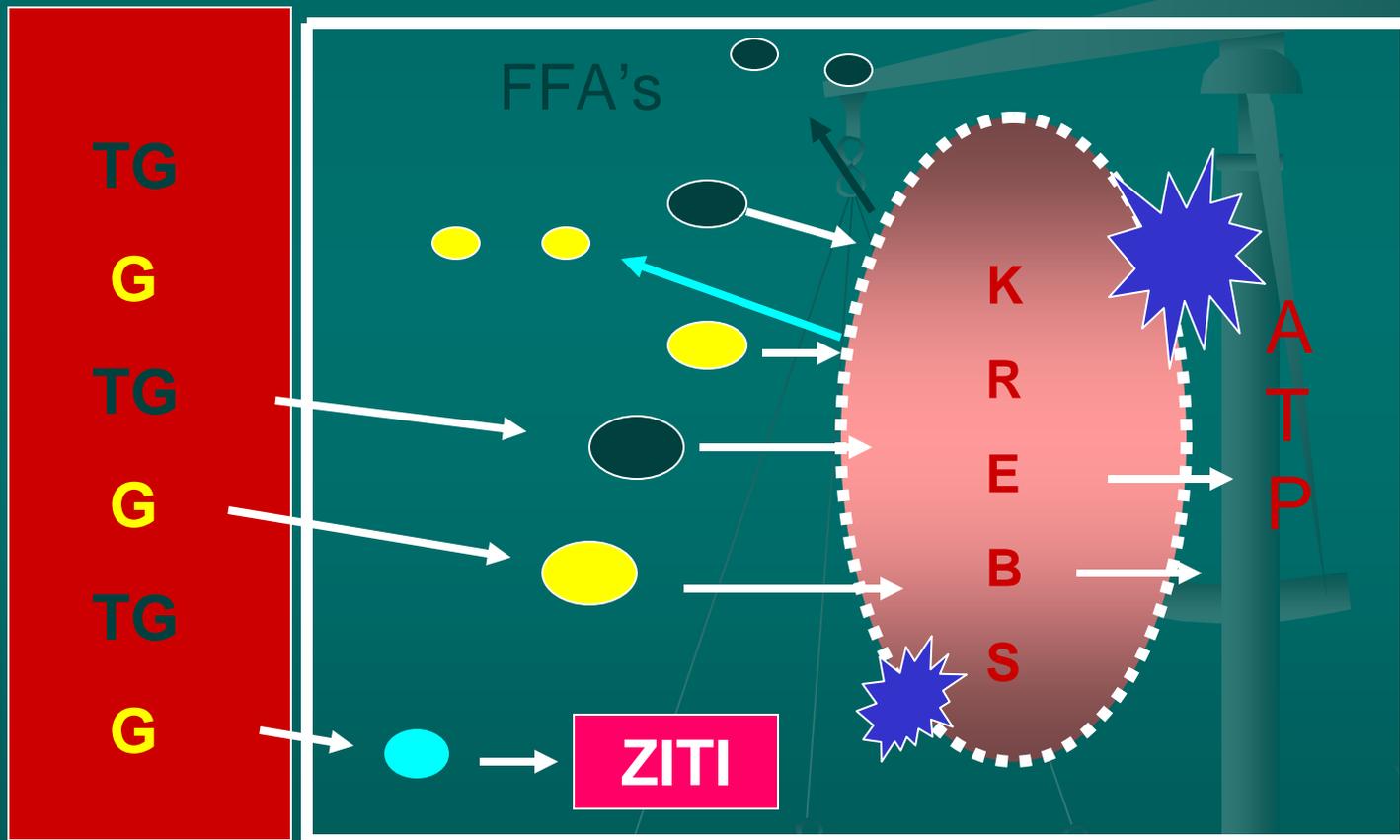
# Co-enzyme Q10 for repair

**Spackling compound for  
mitochondrial inner walls**

**100 milligrams/day**



# Mitochondria: ATP/Energy !



# Caveperson Breakfast

Salmon

Walnuts

Berries

Cottage Cheese

Pecans

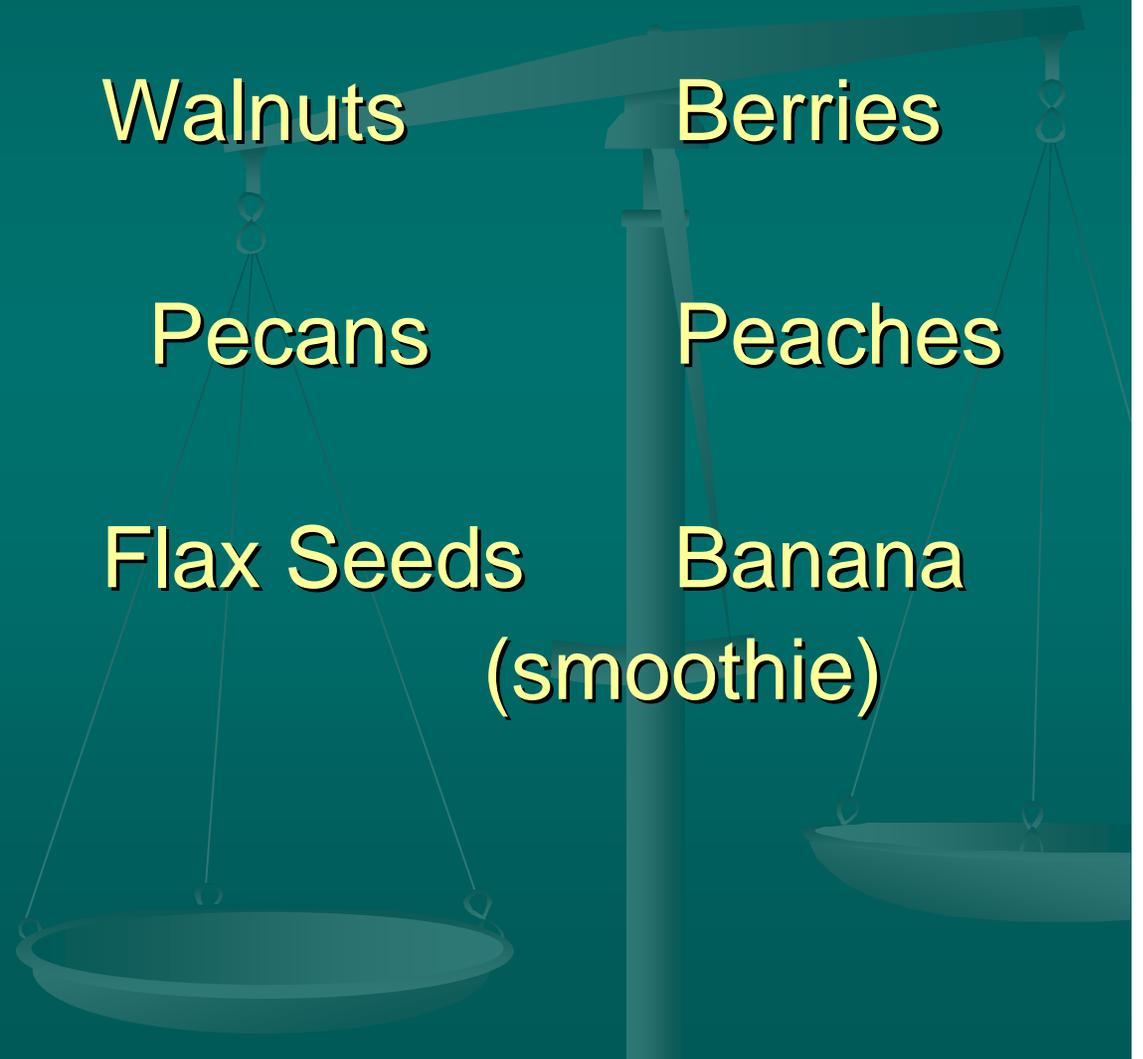
Peaches

**Designer Whey**

Flax Seeds

Banana

(smoothie)



# Caveman Lunch

Salmon White beans Large salad Vinegar

an orange and some yogurt

Cottage Cheese Humus Raw Vegetables

red grapes and cashews

# Caveman Snacks

Nuts and seeds, berries and fruits

red grapes and cashews

dried apricots and Brazil nuts

apple and sunflower seeds

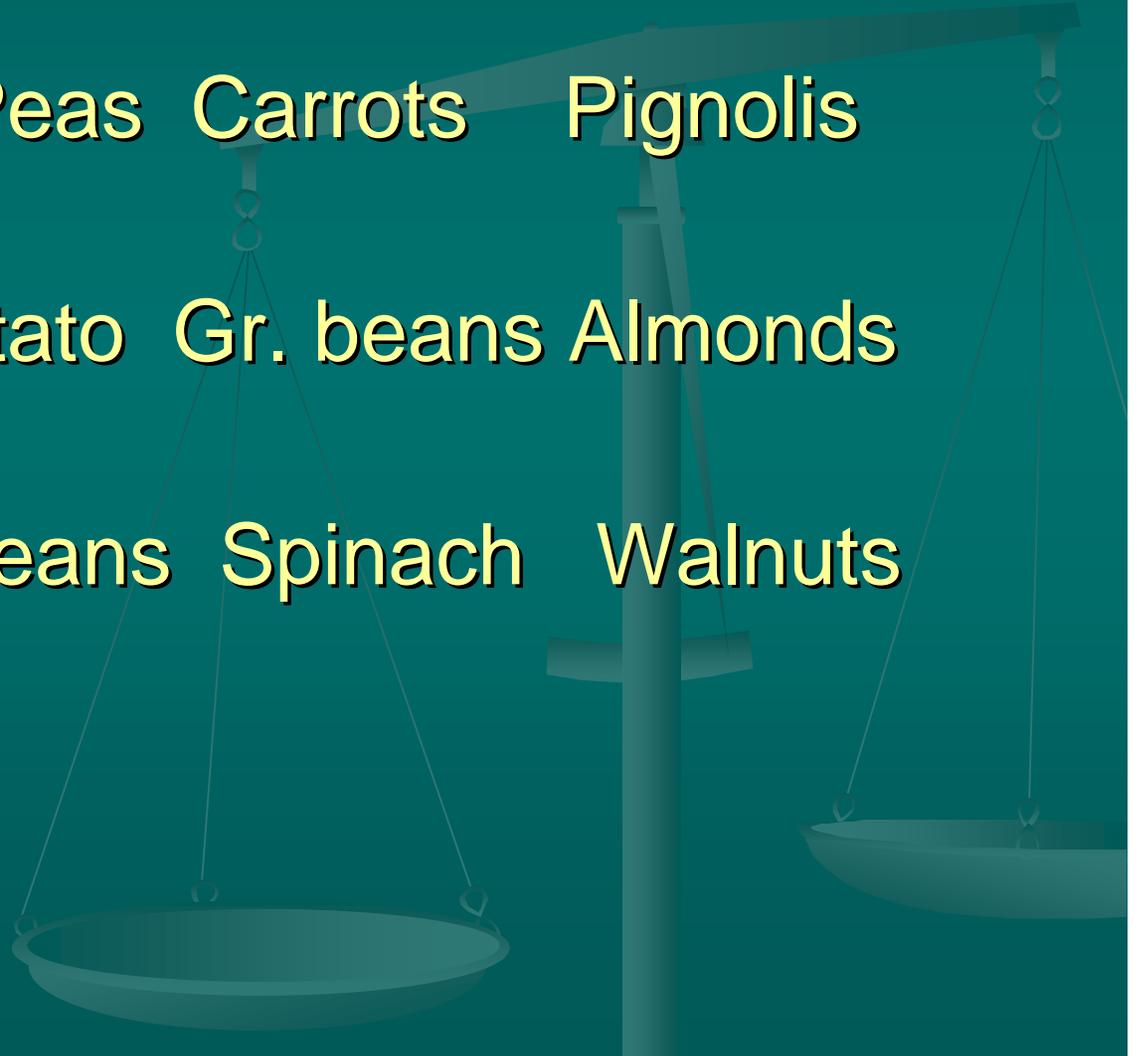
pumpkin seeds and mango

# Caveperson Supper

Salmon Green Peas Carrots Pignolis

Chicken Sw. Potato Gr. beans Almonds

Pork loin Black beans Spinach Walnuts

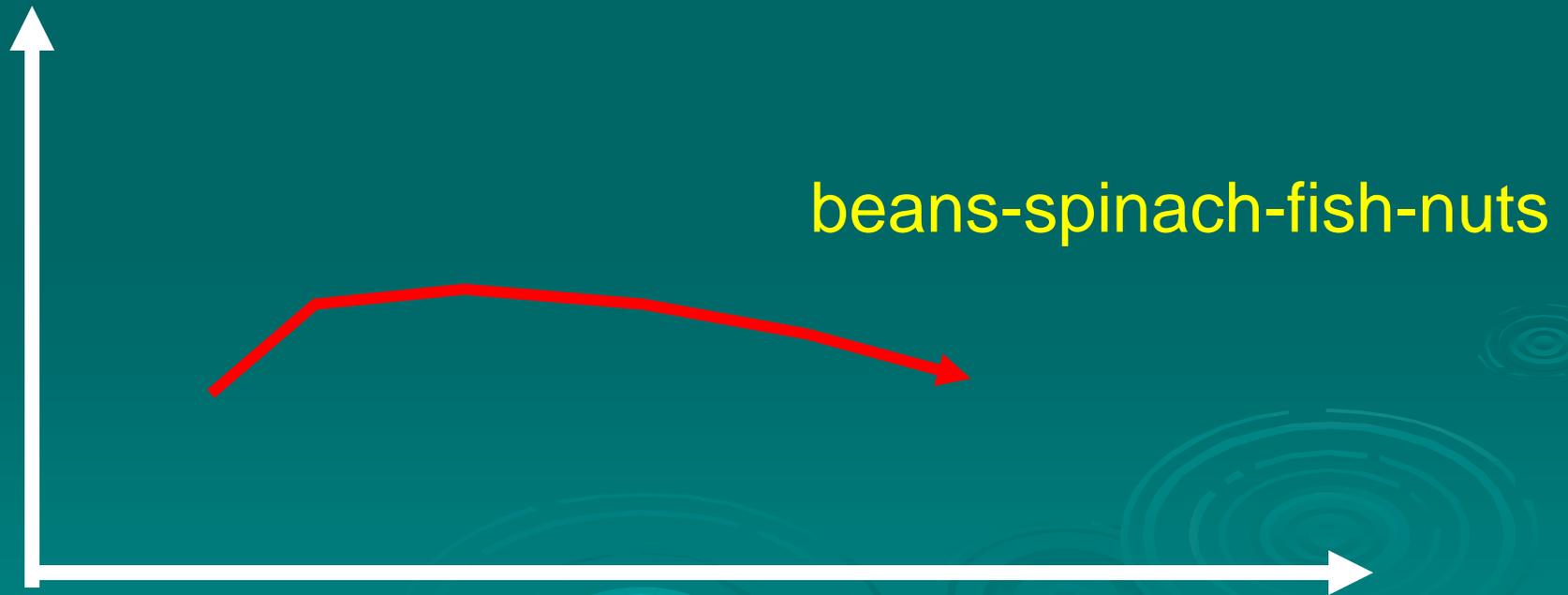


# Nuestro Plato



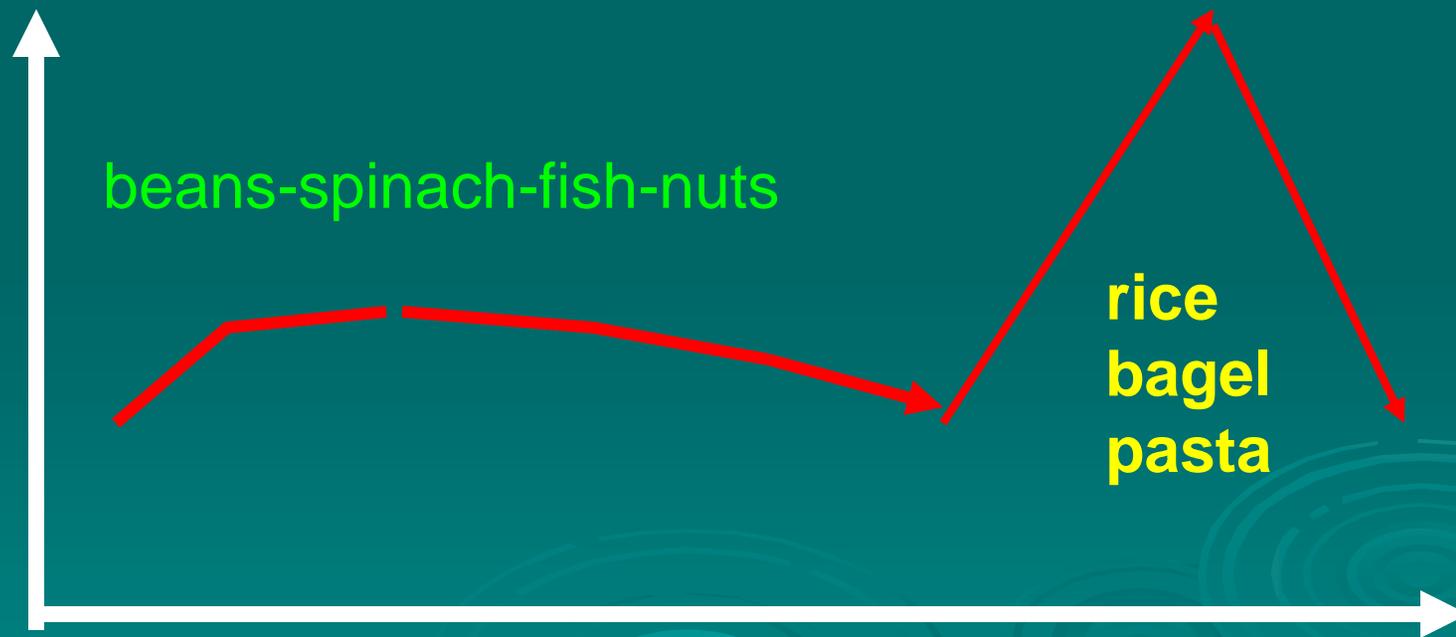


**Insulin:** 1. move sugar,  
2. build fat  
3. retain sodium  
4. make hungry



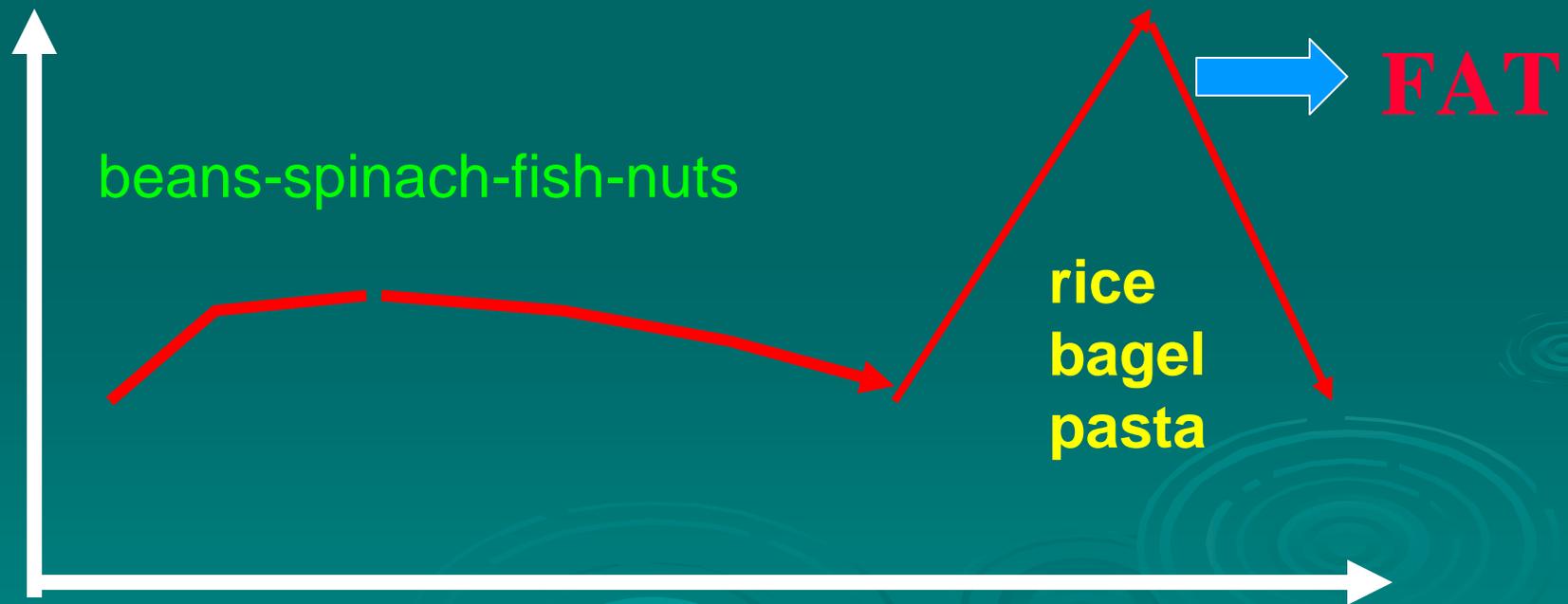
# Cocoa Puffs, Bagels, Pasta Subs, Rice, Beans, Tortillas

spike & crash your blood sugar

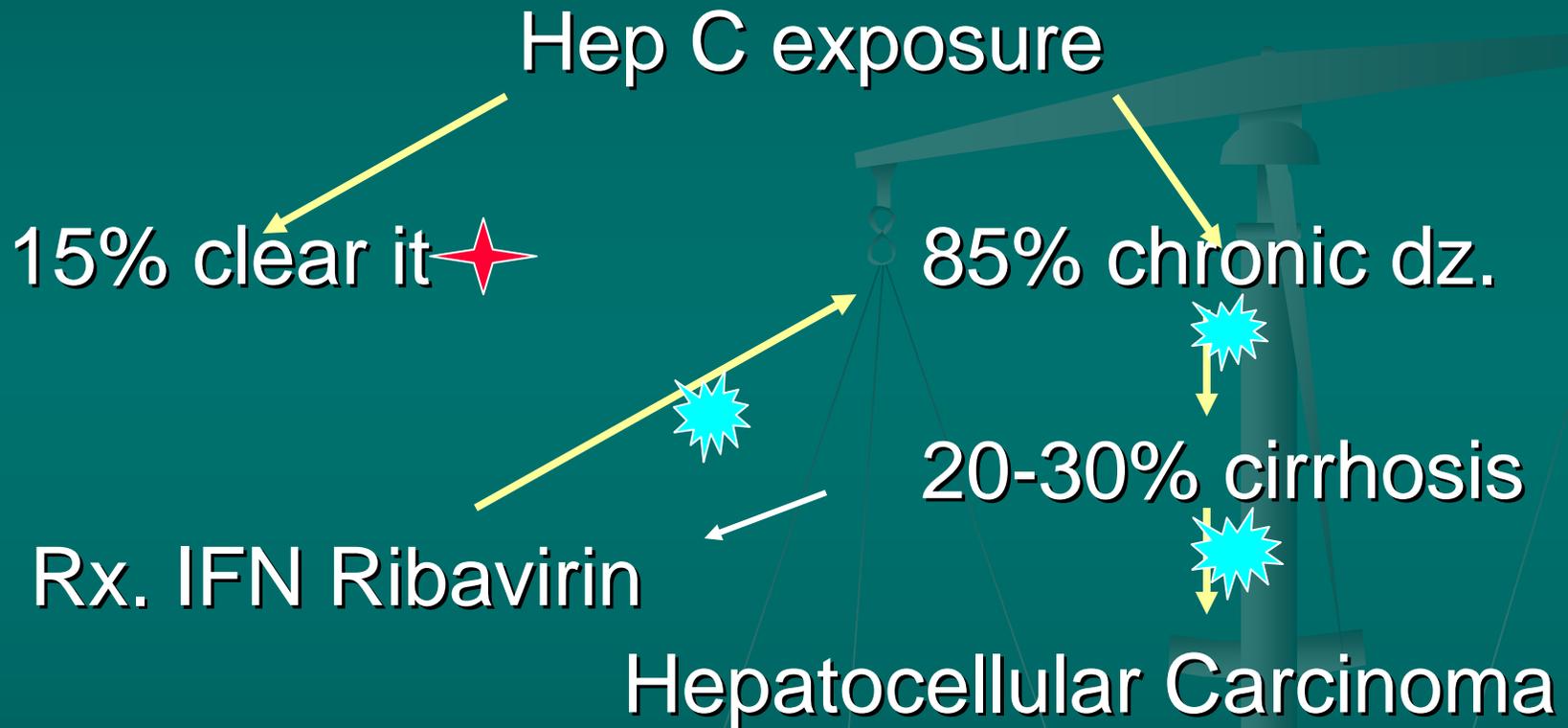


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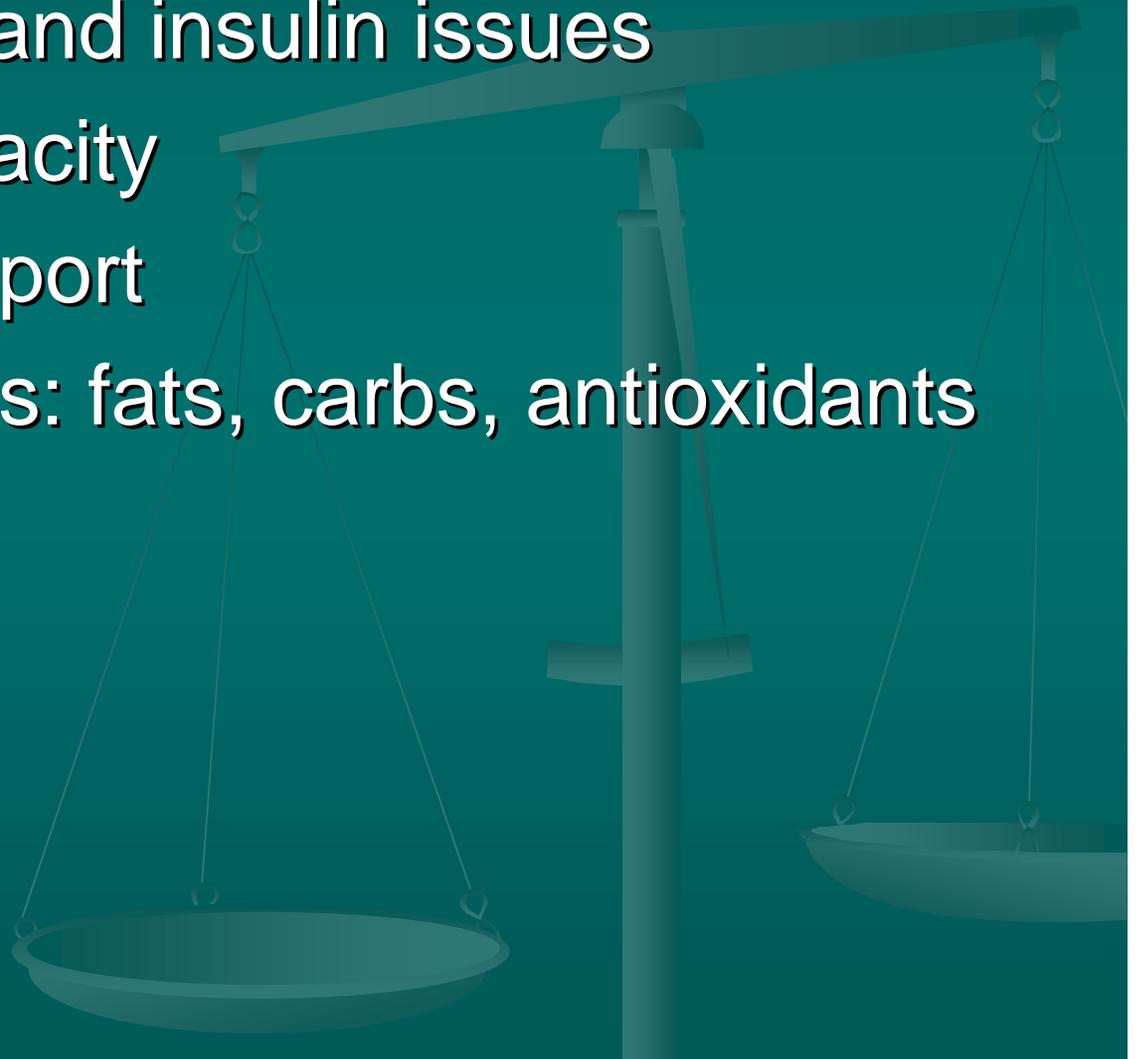


# Chronic HCV

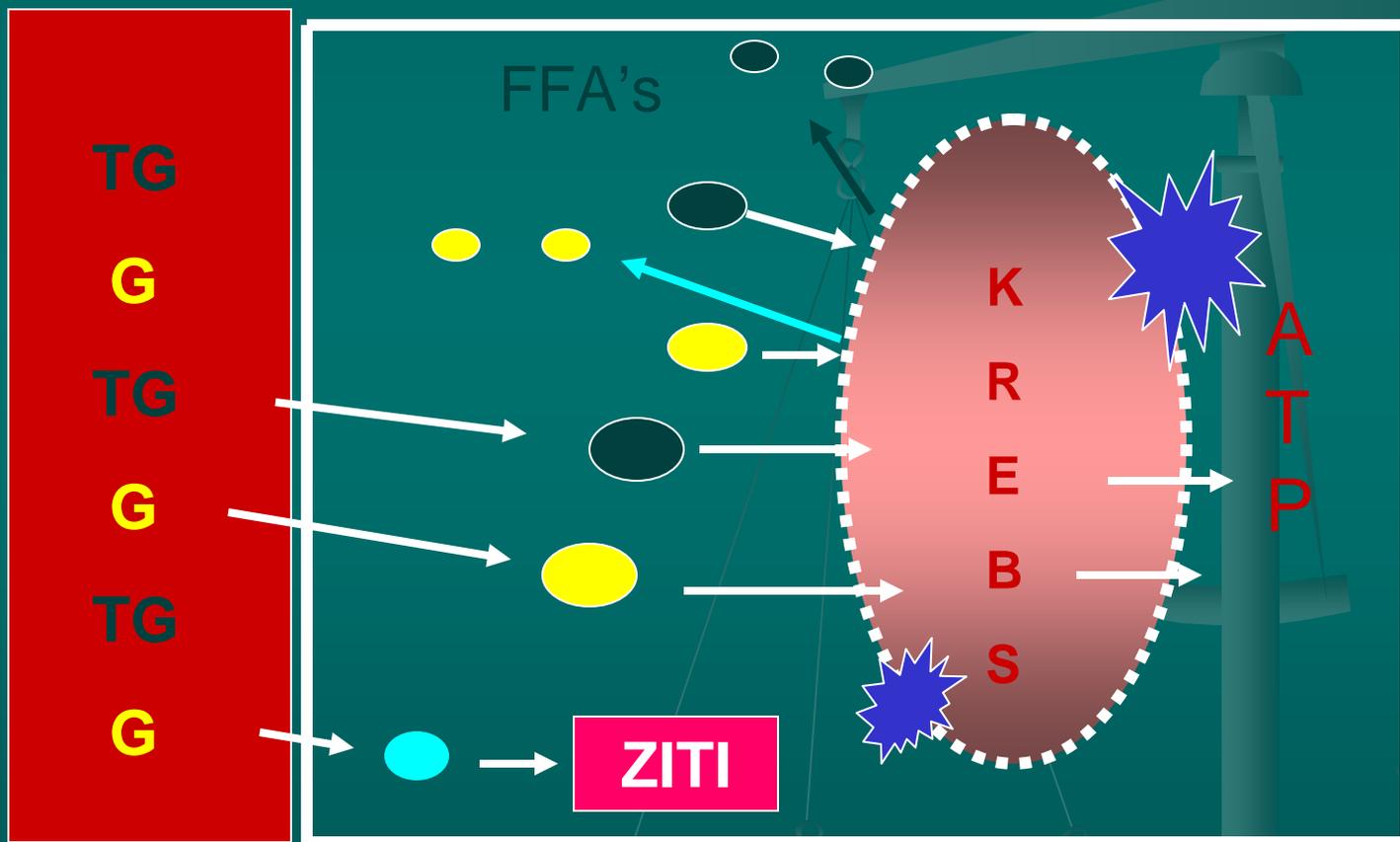


# Conditions to manage

- Intracellular fat and insulin issues
- Antioxidant capacity
- Glutathione support
- Dietary elements: fats, carbs, antioxidants
- Weight status
- Alcohol intake
- Iron intake



# Mitochondria: ATP/Energy !



# Triple Antioxidant Approach

HCV Esoph varices, portal HTN

Mitochondria: B-complex, Co Q10

2 gm vit C, 800 iu vit E

Cell support: 900 mg Milk Thistle

400 mcg selenium

600 mg alpha lipoic acid

Berkson. Triple Antioxidant *Med Klin (Munich)* 1994

# Chronic HCV

Hep C exposure

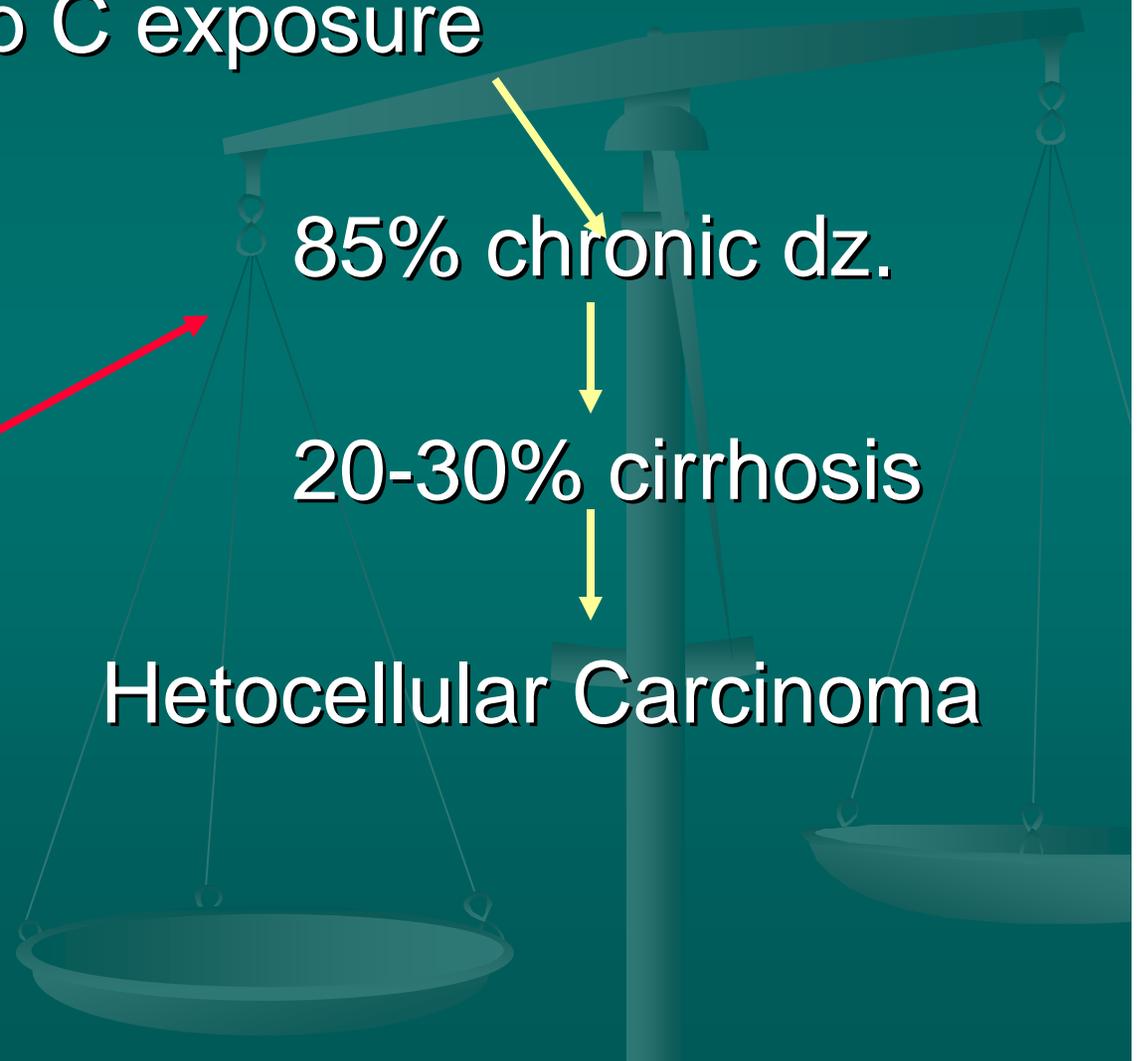
15% clear it

85% chronic dz.

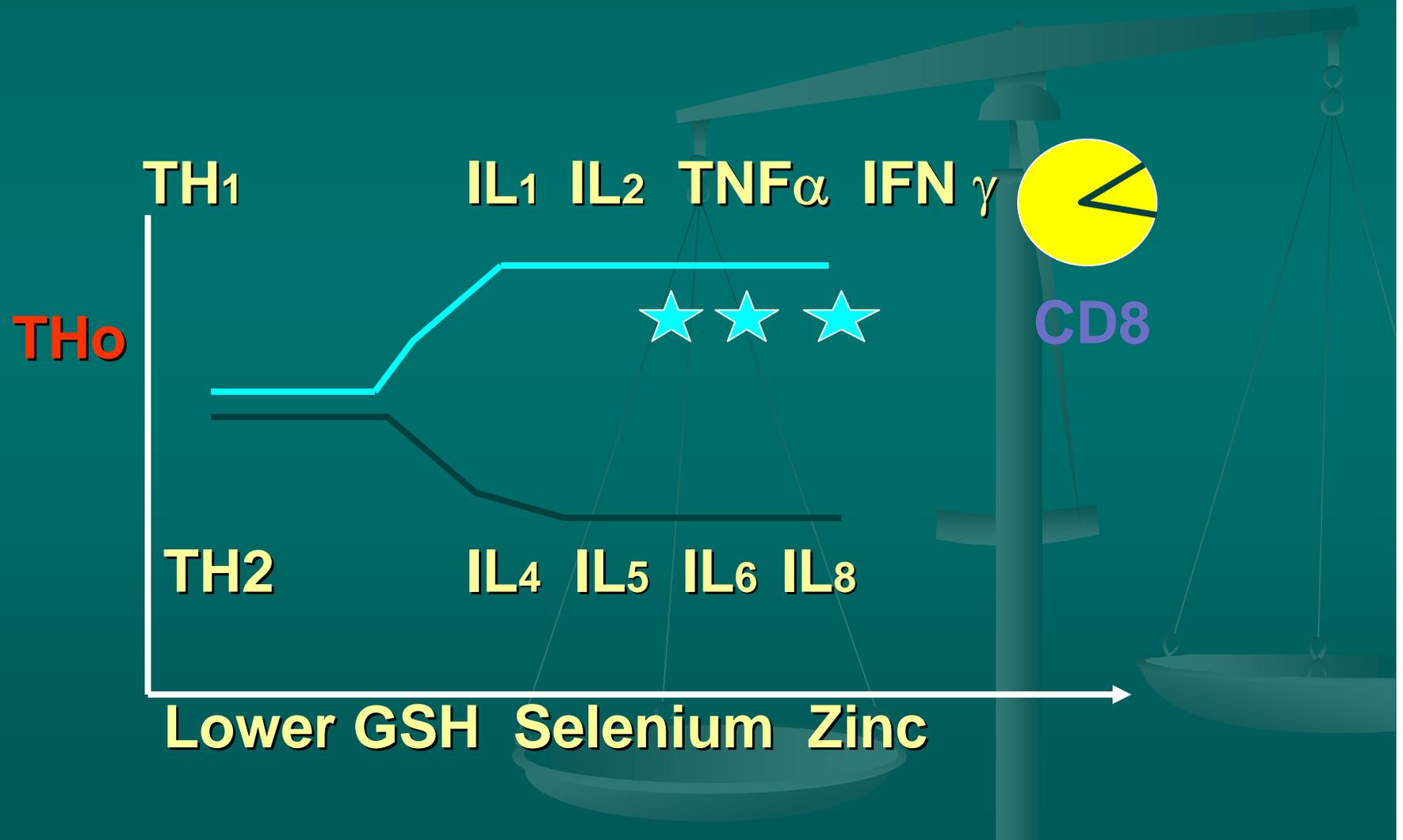
20-30% cirrhosis

Hepatocellular Carcinoma

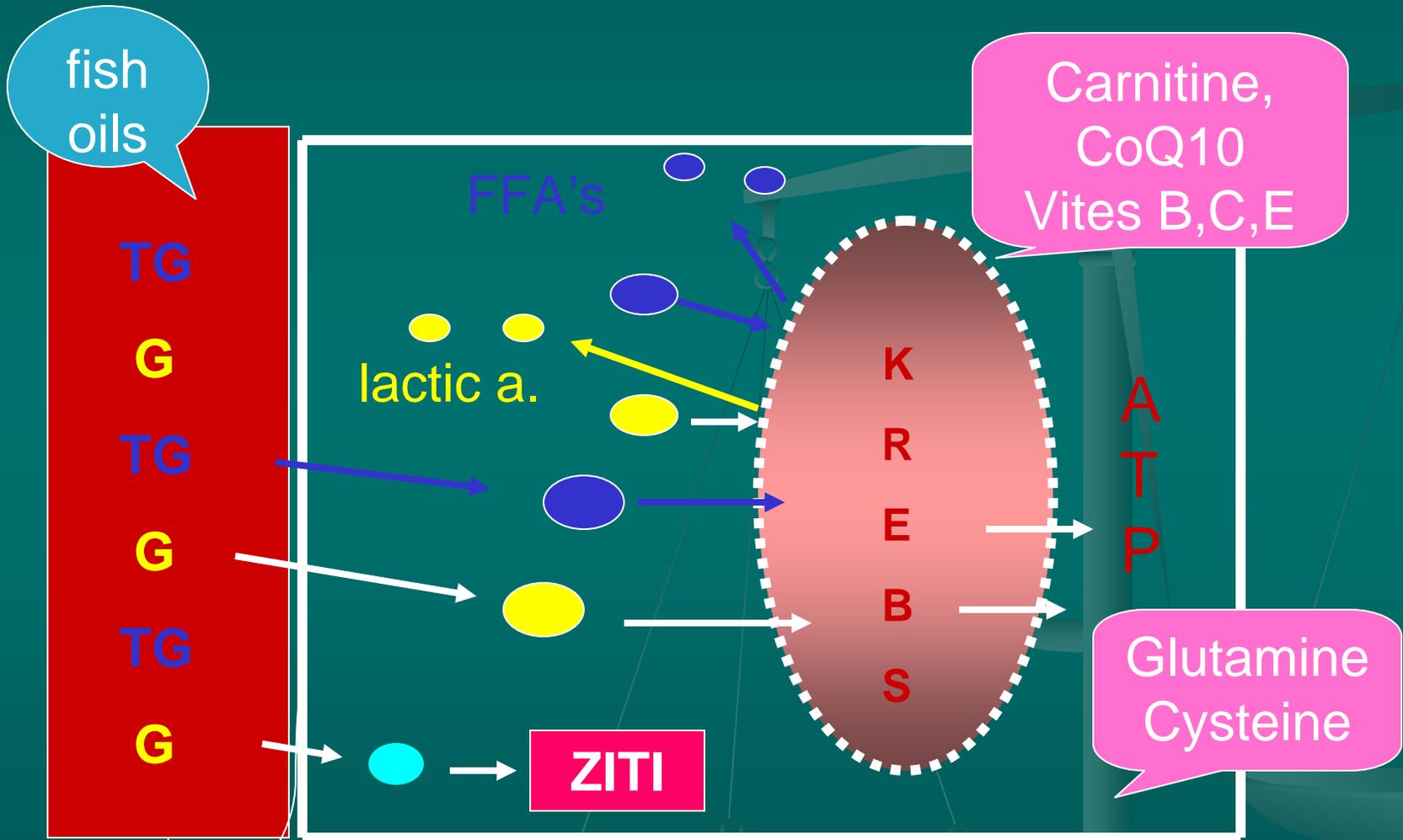
Rx. IFN Ribavirin



# Peg linterferon-Ribavirin



# What to support :



Protein: FISH Glutamine N-acetylcysteine

# Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN 6 mo. .... no eradication
- 2002 LFT's in 250 re-treat:  
16 weeks ..... IFN/RBV  
quit ... too depressed, too sick
- 2004 LFT's 500 re-treat: IFN/RBV  
(see handout ... steps 1, 2, 3)

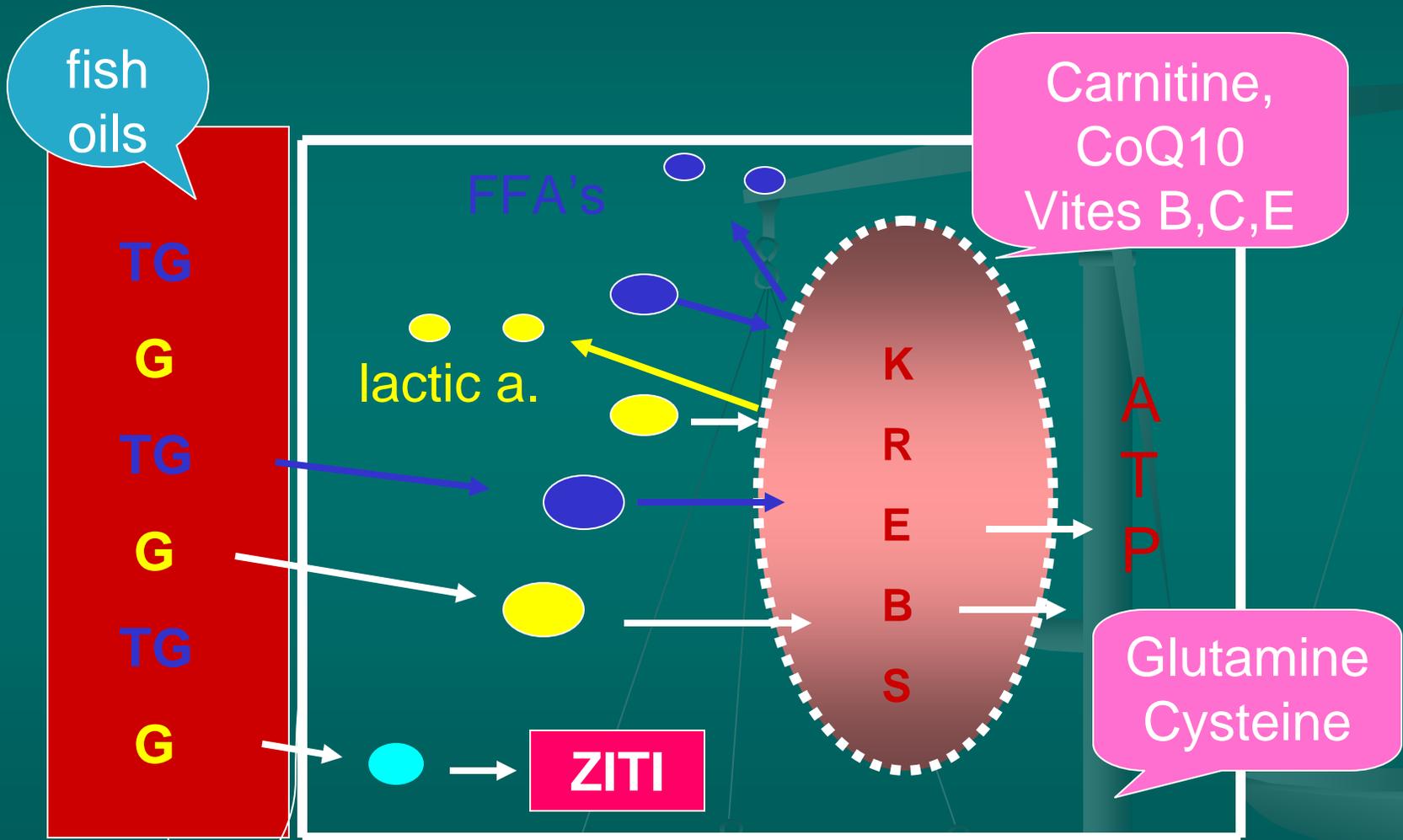
# Case Study

Gene HIV HCV co-infection age 51 ...

- 2000 IFN X 6 mo. ... no eradication
- 2002 LFT's 250 treat: 16 weeks ... IFN/RBV  
quit ... too depressed, too sick
- 2004 LFT's 500 re-treat: IFN/RBV  
(see handout ... steps 1, 2, 3)

**36 weeks: LFT's in the 80's now**

# What to support :



Protein: FISH Glutamine N-acetylcysteine

**Thanks for your attention**

Charlie Smigelski, RD

[www.eatupbooks.com](http://www.eatupbooks.com)



[tongrenhealing.com](http://tongrenhealing.com)

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